OZONE MAINTENANCE PROVISIONS

FOR SALT LAKE AND DAVIS COUNTIES

Section IX, Part D.2

Adopted by the Air Quality Board
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TABLE OF CONTENTS

List of Tables

List of Figures

List of Acronyms Used in this Document

ACT	Alternative Control Technique
AIRS	Aerometric Information Retrieval System (an EPA database)
AO	Approval Order
BACT	Best Available Control Technology
CAA	Federal Clean Air Act, amended in November 1990
CO	Carbon Monoxide
CTG	Control Technique Guidance Document
CFR	Code of Federal Regulations
EEA	Energy and Environmental Analysis, Inc.
EKMA	Empirical Kinetic Modeling Approach (a photochemical model for ozone)
EPA	U.S. Environmental Protection Agency
FAEED	Software developed by EPA to estimate aircraft emissions
FHWA	Federal Highway Administration
HON	Hazardous Organic National Emission Standard for Hazardous Air Pollutants
HPMS	Highway Performance Monitoring System (a transportation model)
I/M	Inspection and Maintenance Program for automobiles
KUC	Kennecott Utah Copper Corporation
LTO	Landing and Take Off
LRTP	Long Range Transport Plan
MACT	Maximum Achievable Control Technology, established under Title III of the CAA
MNR	Monitoring Network Review
MOBILE5A	A model for mobile source emissions
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NO_x	Oxides of Nitrogen
NSR	New Source Review
PC-BEIS	Model for estimating biogenic emissions
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 microns
RACT	Reasonably Available Control Technology
RVP	Reid Vapor Pressure
SBAP	Small Business Assistance Program
SIP	State Implementation Plan
SOCMI	Synthetic Organic Chemical Manufacturing Industry
TPY	Tons Per Year
TSD	Technical Support Document
UAM	Urban Airshed Model
UDOT	Utah Department of Transportation
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
WFRC	Wasatch Front Regional Council

SECTION IX.D.2

MAINTENANCE PROVISIONS

IX.D.2.a. INTRODUCTION

The State of Utah is requesting federal redesignation of Salt Lake and Davis Counties from ozone nonattainment to attainment under Section 107(d) of the Act. In accordance with Section 175A of the Act, revisions are made herein to the Ozone State Implementation Plan (ozone SIP) which demonstrate that Salt Lake and Davis Counties have achieved the standard and can maintain the standard through the year 2007. These revisions are hereafter referred to as the "Maintenance Plan" or "the Plan", which contains the maintenance provisions of the ozone SIP.

(1) Background

The federal Clean Air Act requires areas failing to meet the federal ambient ozone standard to develop State Implementation Plans (SIP's) with sufficient control requirements to expeditiously attain and maintain the standard. In 1977, Weber, Davis, Utah and Salt Lake Counties were designated nonattainment for ozone. In 1981, the EPA redesignated Weber and Utah Counties as attainment for ozone.

In April of 1981, an ozone SIP was submitted to EPA which demonstrated attainment of the standard for both Salt Lake and Davis Counties by May 1, 1984. This ozone SIP submittal was fully approved by EPA. An extension was requested by the State when attainment was not achieved by May 1, 1984 and EPA extended the attainment date for ozone to December 1, 1985.

By May of 1988, the National Ambient Air Quality Standard (NAAQS) for ozone had still not been achieved, and EPA notified the Governor that the ozone SIP was inadequate. The State was required to respond to EPA's request in two phases. Initially, the State was required to correct deficiencies and inconsistencies in the existing rules to verify conformity with the control guidance which EPA had published to that time; and then, update the base year emissions inventory to reflect 1987 actual emissions. The second phase of the response would await EPA's final (but not yet promulgated) national policy on post-1987 ozone/carbon monoxide nonattainment. In compliance with the phase I requirements, the last few necessary corrections were made to the ozone SIP and submitted by the Governor to EPA on July 19, 1991. EPA fully approved these Ozone SIP revisions. EPA never finalized its national policy on post-1987 ozone/carbon monoxide nonattainment areas; therefore, the phase II SIP changes were never made.

In November, 1990, Congress amended the Federal Clean Air Act (the Act). As a result of those amendments, Salt Lake and Davis County were designated as "moderate" nonattainment areas based on ambient monitoring data for 1988 and 1989.

By the end of the 1992 ozone season, the State had adequate ambient monitoring data to demonstrate attainment of the NAAQS for ozone. On November 12, 1993, the Governor submitted a formal request to the Administrator that the Salt Lake/Davis County nonattainment area be redesignated as being in attainment of the NAAQS, and the state, in accordance with the Act, submitted maintenance provisions as a revision to the existing Ozone SIP.

On January 19, 1994, EPA advised the state that the maintenance provisions SIP revision had, in EPA's opinion, failed the completeness criteria. The state, together with other parties, joined in litigation contesting that finding. In June 1994, on the basis of a reorganized State submittal and a parallel processing request, EPA made a finding of "completeness" effective May 12, 1994. Also, as part of the agreement, the state committed to reorganize the submittal, to address outstanding administrative and technical issues, and to approve the corrected maintenance plan for public hearing by October 1, 1994.

During the period from January 19, 1994 to June 1994, as the litigation was seeking resolution, and from June 1994 through August 1994 as preparations were being made to satisfy the agreed-to process, a series of significant regulatory, political and environmental events evolved which made it necessary to update and improve the November 1993 submittal; requisite rules changes were submitted, legislation was passed granting authority to implement an enhanced inspection and maintenance program (hereafter referred to as Enhanced I/M), air monitoring data for 1993 were validated showing no exceedances of the ozone standard in Salt Lake and Davis Counties that year, and the 1993 emissions inventory was completed.

The ozone season of 1994 was characterized by record high temperatures: 21 days over 100 degrees Fahrenheit, 48 days over 95 degrees, 71 days over 90 degrees, with seven days in August setting or tying high temperature records. Notwithstanding these severe meteorological conditions, air monitoring shows no exceedances of the ozone standard in Salt Lake and Davis Counties in 1994.

On January 5, 1995, the Ozone Maintenance Plan for Salt Lake and Davis Counties passed final adoption by the Utah Air Quality Board and the Plan became law in the State of Utah. In 1995 there were two small modifications of the plan: In April 1995, VOC RACT commitments were updated and in August 1995, the contingency measures were revised to be consistent with language in the 1990 Clean Air Act Amendments.

By March 1996, EPA had not taken action to approve or disapprove the reorganized Plan; but, the state had obtained 1994 inventory data and had developed a more realistic methodology for projecting non-road emissions. Since there were no violations, or exceedances of the ozone standard in 1994, and since there existed sufficient inventory data, the State prepared a new revision of the Plan in which 1994 was established as the attainment year inventory for the demonstration of maintenance through 2007. This revision was adopted by the Utah Air Quality Board on June 5, 1996.

By October 1996 Salt Lake and Davis Counties had finalized the details of improvements to their vehicle inspection and maintenance programs, which will be implemented in 1998. Previous versions of the plan had been based on a generic enhanced I/M performance standard because the counties were still examining the options that were available for improving the effectiveness of their programs. The maintenance plan was revised to reflect the actual inspection and maintenance programs that would be used in the area. The area has continued to meet the ozone standard through the summer of 1996.

(2) Maintenance Plan Overview

The Federal Clean Air Act, and EPA policy based on the Act, require that Maintenance Plans satisfy several prerequisites in order to be federally approvable. Federal approval of the Maintenance Plan is necessary in order to officially redesignate Salt Lake and Davis Counties as ozone attainment areas. Table 1 identifies the prerequisites that must be fulfilled before a maintenance plan can be approved. Table 2 identifies the requirements of a Maintenance Plan.

Table 1. Prerequisites to Redesignation

Category	Requirement	Reference	Addressed in Section
Existing Controls	The State must assure that control measures required in past Ozone SIP revisions have been implemented, and that existing RACT controls will remain in effect after redesignation, unless it has demonstrated to EPA's satisfaction through photochemical dispersion modeling, not including EKMA, that the standard can be maintained without a specified control which the state may propose to delete.	CAA: Sec. 172(c)(5)	IX.D.2.b(1)
	Areas that were required to implement transportation control measures and/or inspection/maintenance programs must provide evidence that these programs have been fully implemented.	CAA: Sec. 182(b)(4)	IX.D.2.b(2)
	The state must have an EPA approved SIP control strategy that includes RACT requirements for existing stationary sources covered by CTGs as well as RACT requirements for all major non-CTG sources.	CAA: Sec. 182(b)(2)	IX.D.2.b(3) and (4)
	The state must assure that acceptable provisions exist and are being implemented to provide for new source review.	CAA: Sec. 175A(d)	IX.D.2.b(5)
	The state must demonstrate completion of rule effectiveness studies and small source compliance initiatives, as resources allow.	EPA guidance document on "Rule Effectiveness"	IX.D.2.b(7)
Ozone Monitoring	Three consecutive years of ozone monitoring data must show that violations of the standard are no longer occurring.	CAA: Sec. 107(d)(3)(e)(i)	IX.D.2.c
Verification	The state must verify that the improvement in air quality is due to permanent and enforceable reductions in emissions.	CAA: Sec. 107(d)(3)(e)(iii)	IX.D.2.d
	Stationary, area, and mobile source emission data must be examined for evidence of economic down-turn that may have contributed to attainment, and if appropriate, the State must assure that recovery from the down-turn will not jeopardize continued maintenance of the standard.	Federal Reg. Vol 57 No. 74 13563	IX.D.2.d
Maintenance Plan	Each State which submits a request under section 107 (d) for redesignation shall also submit a revision of applicable SIP to provide for the maintenance of the NAAQS for at least ten years.	CAA Section 175 A	IX.D.2.e,f,g,h,i, and j

Table 2. Requirements of a Maintenance Plan

Category	Requirement	Reference	Addressed in Section
Attainment Emission Inventory	The state can choose to demonstrate maintenance of the NAAQS using an emissions inventory approach. This approach requires the development of an "attainment emission inventory" to identify the level of emissions in the area which is sufficient to attain and maintain the standard.	Calcagni, September 4, 1992	IX.D.2.e
Projected Inventories	Projection inventories must be completed that show the standard can be maintained in the future (i.e., for 10 years after redesignation), especially noting whether future increases in VOC, NO_x, and CO emissions are expected and can be accommodated without additional controls, or whether new controls need to be implemented to insure maintenance of the standard.	CAA: Sec. 172(c)(3)	IX.D.2.f(1)
Conformity	This plan must establish a 20 year budget to be used as a basis for determination of conformity of the Long Range Transportation Plan developed by the Metropolitan Planning Organization.	176(c)	IX.D.2.f(2)
New emission controls	The state must ensure that it has legal authority to implement and enforce all control measures for which emissions credits are assumed in the projection inventory demonstrating maintenance of attainment.	CAA: Sec. 110(a)(2)(B) and Calcagni Sept. 4, 1992	IX.D.2.g
Contingency Measures	Section 175A of the Act requires that areas seeking redesignation from nonattainment to attainment develop contingency measures that include state commitments to implement additional control measures in response to future violations of the NAAQS.	CAA: Sec. 175 and Calcagni Sept. 1992	IX.D.2.h
Verification of Continued Maintenance	The maintenance plan must indicate how the state will track the progress and the Maintenance Plan.	CAA: Sec. 172(c)(3)	IX.D.2.j

IX.D.2.b. EXISTING REGULATIONS AND CONTROLS

Requirements Relating to Existing Controls and Regulations:

- *The State must assure that control measures required in past Ozone SIP revisions have been implemented and that existing reasonably available control technology (RACT) controls will remain in effect after redesignation, unless it has demonstrated to EPA's satisfaction through photochemical dispersion modeling, not including EKMA, that the standard can be maintained without one or more controls.*

- *Areas that were required to implement transportation control measures and/or inspection/maintenance programs must provide evidence that these programs have been fully implemented.*

- *The State must have an EPA approved SIP control strategy that includes RACT requirements for existing stationary sources covered by control techniques guidelines (CTG), as well as RACT requirements for all major non-CTG sources. The State must confirm that all affected VOC, and NO_x sources have either installed or are operating RACT controls.*

- *The State must assure that acceptable provisions exist and are being implemented to provide for new source review.*

- *The State must demonstrate completion of rule effectiveness studies and small source compliance initiatives, as resources allow.*

(1) Enforcement of Existing Ozone State Implementation Plan

Technical Support Document, Volume 1, Tab 1.1

This SIP revision incorporates federal requirements for demonstrating that the ozone standard can be maintained in future years in the Salt Lake and Davis County nonattainment areas. The State will continue to enforce the requirements of the existing Ozone SIP until the redesignation request is approved. The State also certifies that all existing RACT controls required in past Ozone SIP revisions, and new RACT controls incorporated in these revisions, will remain in effect after redesignation of the region to attainment, unless the State demonstrates to EPA's satisfaction through photochemical dispersion modeling that the standard can be maintained without a specific control which the State may propose to delete.

(2) Assurance That Existing VOC, NO_x and Transportation Control Measures Have Been Fully Implemented

Technical Support Document, Volume 1, Tab 1.1

The State certifies that, to the best of its knowledge, volatile organic compound (VOC) and oxides of nitrogen (NOx) sources covered by State RACT rules in the Salt Lake and Davis County nonattainment area have either installed and are operating RACT controls in compliance with state law or federal law, or

are on an enforceable compliance schedule. All of the programs which were implemented before and/or during the 1994 attainment year inventory such as Reid Vapor Pressure (RVP), basic inspection and maintenance (I/M), and the anti-tampering program are currently required for air quality purposes in the Salt Lake and Davis County nonattainment area. The basic I/M program and the anti-tampering program were included in past attainment demonstrations for ozone SIP revisions. The State will assure that all of the programs implemented by the Ozone SIP, including the aforementioned control measures, will be maintained in future years in order to maintain the national ambient air quality standards.

(3) VOC RACT Requirements and CTGs

Technical Support Document, Volume 20, Tabs 1.0, 1.1, 1.2, 1.3, and 1.4

Section 182(b)(2) of the Act requires States to implement reasonably available control technology (RACT) with respect to each of the following:

(A) Each Category of VOC sources in the area covered by a Control Technique Guidance (CTG) document issued by the Administrator between the date of the enactment of the Clean Air Act Amendments of 1990 and the date of attainment.

(B) All VOC sources in the area covered by any CTG issued before the date of the enactment of the Clean Air Act Amendments of 1990.

(C) All other major stationary sources of VOCs that are located in the area.

The three RACT categories are addressed in sections (a), (b), and (c).

(a) VOC Sources Covered by a CTG Issued after 1990 -Negative Declaration

Technical Support Document, Volume 20, Tabs 2.1, 2.2, 2.3, and 2.4

Section 183(a) of the Act states, "Within 3 years after the date of the enactment of the Clean Air Act Amendments of 1990 (November 15, 1993), the Administrator shall issue control techniques guidelines, in accordance with section 108, for 11 categories of stationary sources of VOC emissions for which such guidelines have not been issued as of such date of enactment, not including the categories referred to in paragraphs (3) and (4) of subsection (b)." A tentative list of the 11 such source categories was identified in the Federal Register (Vol. 57, No. 82, April 28, 1992, Proposed Rule) by the EPA. These categories are listed in Table 3.

Section 183 of the Act also requires EPA by November of 1993 to issue CTGs for the following (also listed in Table 3):

1) Reduction of VOCs from aerospace coatings and solvents from shipbuilding operations and repair and;

2) the completion of a study of VOC emissions from consumer/commercial products, and to then regulate those product categories.

Although EPA was required to issue CTGs for these 13 categories by November 15, 1993, due to funding and time constraints only two of the CTGs have been issued, while the rest have been issued as final or proposed alternative control techniques (ACTs). ACTs may be used as guidance, but are not considered required controls under Section 182(b)(2) of the Act. Table 3 shows the current status of each of the CTGs, and identifies major VOC sources that may be affected by the CTG when it is issued. The two CTGs that have been issued are:

1. CTG for Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation, published 11/15/93
2. CTG for SOCMI Reactor, published 11/15/93

There are no affected SOCMI sources in the ozone nonattainment area; therefore the two CTGs that have been published since 1990 are not applicable in Utah.

Table 3. VOC CTG Categories Required by the Act

Category	Status	VOC Source in the NAA that may be Affected
SOCMI Distillation	CTG issued 11/15/93	Negative Declaration
SOCMI Reactors	CTG issued 11/15/93	Negative Declaration
Wood Furniture Finishing	ACT (proposed CTG and proposed MACT)	Yes. Olympia Sales
Surface Coating of Automotive/Transportation Plastic Parts	ACT	No major source
Surface Coating of Business Machine Plastic Parts	ACT	No major source
Offset Lithographic Printing	Draft CTG, ACT, and proposed MACT	No major source
Industrial Wastewater	Draft CTG and proposed MACT and the HON	No major source (refineries not included in draft CTG)
Automobile Refinishing	ACT	No major source
Batch Processes	CTG proposed	No major source
Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks	ACT	Yes -Refineries
Industrial Cleaning Solvents	ACT and MACT	No major source.
Aerospace Manufacturing and Rework Industry	MACT	Yes -Hill Air Force Base
Boat Manufacturing	ACT and proposed MACT	Negative Declaration

Commitment to Adopt Future CTGs

As each CTG is issued, the State will review the sources in the nonattainment area, and either issue a negative declaration for that particular source category, meaning that there are no sources for which the

CTG is applicable or revise its rules in a manner consistent with a SIP revision to incorporate RACT (in the context of Section 182(b)(1)(A) of the Act) for the following categories:

1) those source categories of VOC for which EPA issues a CTG document during the time between the submittal of the redesignation request, and the time when the area is officially redesignated to attainment in the Federal Register; and
2) at any time thereafter as CTGs are published by the EPA.

In the event that the EPA should deviate from the CTG approach, the State will evaluate the situation on a case-by-case basis. For example, EPA may choose to issue a federal regulation instead of a CTG. In that case, if there are affected sources, the State will adopt rules which incorporate the federal regulation.

(b) VOC Sources Covered by a CTG Issued before 1990

Technical Support Document, Volume 20, Tabs 3.1 and 3.2

During the development of the ozone SIP in Section IX.D.1, RACT was established for source categories based on CTGs that had been issued by EPA. The source categories covered by the state's RACT rules and the corresponding Utah Administrative Code numbers are listed below. Copies of these EPA approved RACT rules are on file at the Division of Air Quality. These categories address all CTGs issued prior to 1990, that are applicable to sources in the nonattainment area. Absence of a RACT rule for certain categories indicates that no sources in these categories have been identified in the Salt Lake and Davis County areas.

- **R307-14-1** Nonattainment Area Requirements -Ozone (basic requirements for existing major and minor sources of VOC and NO_x).
- **R307-14-2** Control of Emissions from Petroleum Liquid Storage (VOC storage tanks, reservoirs or containers).
- **R307-14-3** Control of Emissions from Gasoline Transfer and Storage (loading of tank trucks, trailers, railroad tank cars, and other transport vehicles).
- **R307-14-4** Control of Hydrocarbon Emissions in Refineries.
- **R307-14-5** Control of Emissions from Degreasing and Solvent Cleaning Operations.
- **R307-14-6** Restrictions on Cutback Asphalt.
- **R307-14-7** Control of VOC Emissions Associated with the Coating of Paper, Fabric, Vinyl, Metal Furniture, Large Appliances, Magnet Wire, Flat Wood Paneling, Miscellaneous Metal Parts and Products, and Graphic Arts.
- **R307-14-8** Control of Emissions from Perchloroethylene Dry Cleaning Plants.

- **R307-14-9** Compliance Schedule (compliance date for affected sources).

(c) Major Stationary Sources That Are Not Covered by a CTG

Technical Support Document, Volume 20, Tabs 4.1, 4.1.1, 4.1.2, 4.1.3, 4.2, 4.2.1, 4.2.2, 4.2.3, 4.2.4; Volumes 21 and 22; Volume 23, Tabs 4.2.5, 4.2.6; and Volume 2, Tab 2.2g

Utah has established RACT for all major sources of VOC in Salt Lake and Davis Counties that are not covered by sections 182(b)(2)(A) and (B) above. The following major sources of VOC were identified in the Salt Lake/Davis nonattainment area:

Amoco
Chevron Refinery
Crysen Refinery
Flying J
Hill Air Force Base
Olympia Sales
Phillips Refinery

Because all of these major sources are also subject to pending CTGs, EPA has suggested that section 182(b)(2) of the Act requires establishment of VOC RACT for these sources or source categories under subsection (A) instead of (C). The State addressed this by referencing both subsections (A) and (C) when establishing RACT.

The State has established RACT on a case-by-case basis for each of the major sources. Existing rules, approval orders, and other applicable requirements were reviewed in conjunction with the ACTs or draft CTGs that have been issued by EPA to determine RACT for each source. The following factors were considered when determining RACT for an individual source:

1. EPA was required to issued CTGs for 13 source categories by November 15, 1993, but has only finalized two of the CTGs. EPA has issued ACTs or draft CTGs for the other categories, but these documents have not gone through rulemaking, and could change significantly before the final CTG is issued. All major VOC sources in the nonattainment area will be affected by one or more of these pending CTGs. Because the CTGs are still pending, any RACT requirement that is now made by the State could be different than what will be required by the future CTG. Major sources could be subject to two different requirements within a short period of time, which could be expensive without providing a significant environmental benefit.

2. Utah has adopted specific VOC RACT requirements for all source categories covered by final CTGs which apply to sources in Utah. These rules (R307-14) are currently in effect, and have resulted in significant emission reductions from the five refineries and Hill Air Force Base.

3. The existing VOC RACT requirements in R307-14 were a major factor in reaching attainment of the ozone standard in Salt Lake and Davis Counties.

4. The Salt Lake/Davis nonattainment area has not violated the Ozone standard since 1991.

5. The definition of RACT in 40 CFR 51.100(o) says that the necessity of imposing controls in order to attain and maintain a national ambient air quality standard, the social, environmental and economic impact of such controls, and alternative means of providing for attainment and maintenance of the standard are to be taken into account in the establishment of RACT.

6. The State is committed to adopt RACT rules for all sources (minor and major) that are affected by a finalized CTG. At the time the CTG is finalized and a presumptive norm is established, the State will either issue a negative declaration or revise its rules in a manner consistent with a SIP revision to incorporate RACT that is at least as stringent as the presumptive norm outlined in the final CTG for the affected sources.

7. The new source review rules in R307-1-3 require all new or modified sources to obtain an approval order before beginning construction. When issuing the approval order, the State requires that the Best Available Control Technology (BACT) be applied to the new or modified source. BACT requires that the most effective engineering techniques and equipment be used to minimize emissions into the environment.

After considering the above factors, the State is establishing RACT, as required by Section 182 of the federal CAA, to be:

(i) For Amoco, Chevron, Crysen, Flying J, and Phillips: The applicable R307-14 rules.

(ii) For Hill Air Force Base: The specification and control requirements in the conditions which regulate VOC emissions in the Approval Orders (AOs) listed in Table 4:

Table 4. Hill Air Force Base Approval Orders

Document Number	AO DATE	ACTIVITIES COVERED BY APPROVAL ORDERS
E-163-96	Feb. 9, 1996	Medium Pressure Water & Chemical Paint Stripping of Aircraft
E-1134-95	Dec. 7, 1995	Setup Chemical Milling Process Line
E-860-95	Sept. 20, 1995	Phase II Vapor Recovery at Building 454 (letter)
E-775-95	Aug. 30, 1995	Engine Test Facilities
E-403-95	May 8, 1995	Boilers
E-067-95	Jan. 31, 1995	Painting Operations
E-068-95	Jan. 30, 1995	Toxic Calculations
E-824-94	Sept. 29, 1994	Used Oil Burner/Boiler
E-752-93	Aug. 27, 1993	Boilers, Carbon Brake Coating
E-719-93	Aug. 20, 1993	Emergency Power Generators
E-0103-93	Feb. 11, 1993	Aircraft Purge System
E-1171-92	Jan. 4, 1993	Emergency Generators and Media Blast Booth
E-416-92	April 28, 1992	Wastewater Treatment Plant

E-167-92	Feb. 19, 1992	JP-4 Tank Throughput
E-894-91	Nov. 25, 1991	Boilers
E-039-91	Feb. 7, 1991	Dip Tank, Bake Oven
E-669-88	Dec. 20, 1988	Paint Distillation Unit
E-525-88	Oct. 13, 1988	Dip Tanks, Steam Cleaning Booth, Boiler, Bead Blast Unit
E-353-88	July 21, 1988	Cold Solvent Cleaning Tanks
E-026-88	Jan. 20, 1988	Solvent Spray Booth
	Feb. 20, 1986	Industrial Waste Treatment Plant Air Stripper
	Feb. 5, 1985	Hydrazine Incinerator
	July 18, 1983	Fuel Tank Vapor Recovery
	June 27, 1978	Fume Scrubber, Process Ovens, Melt Furnaces

(iii) For Olympia Sales: The specifications and control requirements in the conditions which regulate VOC emissions in Approval Order E-0300-95 dated April 13, 1995. This Approval Order was based on BACT at the time it was issued.

All known major sources of VOC have been addressed through a case-by-case RACT determination, which ensured that VOC RACT was implemented as of May 15, 1995. In addition, R307-14-1.D covers the possibility that major sources of VOC may exist in the nonattainment area that have not been identified. This "generic RACT rule" requires all existing major sources to apply RACT. If an existing source is identified in the future, the State shall make a RACT determination for the source, and shall submit the determination to the EPA for approval as a SIP revision.

(d) Certification That All Known Sources Have Been Addressed

The State certifies that it has adopted RACT rules, or has established a schedule and commitment for development of case-by-case RACT determinations, for all known stationary sources of VOC covered by Section 182(b)(2) of the Act in the Salt Lake and Davis County nonattainment area. The State also certifies that, upon completion of the 1990 Base Year Inventory and the 1994 Attainment Inventory, it is unaware of any major source of VOC which is not included in the above list of sources which are subject to a case-by-case RACT determination.

If any additional existing major source is found by either the State or by the EPA in the future, the source will be required to apply RACT under the generic VOC RACT rule in R307-14.1.D. The State shall expeditiously develop a case-by-case RACT determination based on the existing CTG or as defined in 40 CFR 51.100(o) for such sources upon their discovery, and shall submit such determination to EPA for approval as an approval order or as a specific SIP revision.

(e) New Sources of VOC

Technical Support Document, Volume 23, 5.1 and 5.2

Any new major or minor source permitted in the future shall be required to meet the Best Available Control Technology (BACT) requirements in R307-1-3.1.8.A, which will be at least as stringent as RACT. The BACT determination process accomplished by the Division of Air Quality will include an evaluation of published or pending CTGs and ACTs. The BACT determination will be at least as stringent as any published CTG.

(4) NO_x RACT Requirements

Technical Support Document, Volume 1, Tabs 1.2.c, 1.2.d, and 1.2.e

Section 182(f) of the Act requires that the SIP contain RACT rules for major sources of NO_x as categorized in Section 182(b)(2)(A) and (C) of the Act.

(a) NO_x RACT General Requirements

R307-14-1 has been amended at paragraph D(2) to require that all existing major sources of NO_x in the ozone nonattainment area (and Salt Lake and Davis Counties) utilize RACT. This is analogous to section 182(b)(2)(C) of the Act and may be referred to as "generic" NO_x RACT as it does not prescribe RACT to specific source categories.

In a manner similar to the "CTG approach" taken for sources of VOC in section 182(b)(2)(A) of the Act, EPA will be publishing Alternative Control Guidance Documents (ACTs) containing what it calls "presumptive levels of RACT" for various source categories of NO_x. The states will be required to respond by either incorporating such levels of RACT into their rules, or by issuing negative declarations. To meet this requirement, the State, in addition to adopting a "generic NO_x RACT rule", is adding as a SIP revision a commitment to respond to these determinations as outlined in the following paragraph:

As the EPA publishes ACT documents containing new determinations of what constitutes RACT for various source categories of NO_x located within nonattainment areas for ozone, the State will either make a negative declaration for that source category in Salt Lake and Davis Counties, or will revise the Air Conservation Rules to reflect such determinations. This documentation will then be submitted to EPA for approval as a specific SIP revision according to the schedule included in the final guidance. In the absence of such an implementation schedule the State will act as expeditiously as practicable.

The EPA has already identified presumptive levels of RACT for "certain utility boilers." A "utility boiler" is defined as any steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW electric output to any utility power distribution system for sale. The State identified two sources in Salt Lake County that were potentially affected by this rule, the Gadsby Plant owned by PacifiCorp and the Utah Power Plant owned by Kennecott Utah Copper.

1) The Gadsby Plant owned by PacifiCorp. This plant underwent a RACT determination in 1990 for the PM_{10} SIP and is now regulated under Section IX.H of the SIP. Under that determination the facility is prohibited from burning coal, the fuel for which each of the three

units was primarily designed, and is required to meet limits for NO_x which were based on the installation of low NO_x burner technology. Subsequent to that RACT determination, the Gadsby plant identified itself, for the purposes of the Acid Rain program, as a gas fired utility. It could be construed from this declaration that this facility should be subject to the RACT levels identified for gas fired units; however, it is the State's position that this facility was designed as, and has been historically operated as, a coal fired unit. Were it not for the PM_{10} SIP, coal would still be the primary fuel burned at the facility. Thus, one viable means of compliance with the RACT levels for such coal fired units would be to switch fuels to natural gas, and to install low NO_x burners. This has already been accomplished. After taking into account the different firing configurations (and therefore different levels of RACT) of the three units, the historic level of NO_x while firing coal is estimated at 0.77 lb/mmbtu, while the new federal levels of RACT for coal firing would require 0.48 lb/mmbtu. Due to the RACT determination for PM_{10}, the facility is now operating at 0.28 lb/mmbtu, whereas the new federal levels of RACT for gas firing would require 0.26 lb/mmbtu. Because EPA has acknowledged the inherent variability in the levels of control that are attainable when retrofitting older units that were not designed with any level of NO_x control in mind, and allows regional averaging amongst different facilities, an argument could be made that this facility has not only met the NO_x RACT requirements for coal fired units, but for gas fired units as well.

2) The Utah Power Plant owned and operated by Kennecott Utah Copper (KUC). This plant does not meet the definition of "utility boiler" because the plant has not sold any electricity since 1949. The State has, however, evaluated the facility under the provisions of the generic RACT rule which applies to any existing major source of NO_x. In order to comply with the PM_{10} SIP, KUC has switched fuels from coal to natural gas in each of its four boilers during the wintertime PM_{10} season (November through February). Because coal is still burned throughout the remainder of the year, RACT was re-evaluated due to subsequent NO_x RACT requirements in the Clean Air Act Amendments of 1990. Recent stack testing while burning coal shows that boiler no. 4 (an 83.3 MW tangentially fired unit) can operate within an emission limit equivalent to 0.45 lb NO_x per mmbtu. This limit is identified by EPA in its NO_x RACT Guidance (57 FR 55620) for tangentially fired coal burning "utility" boilers and EPA has historically prescribed less stringent NO_x standards for industrial boilers than for electric utility boilers. KUC has informed the State that it is willing to accept an equivalent emission limit (in terms of 384 ppm and 377 lb/hr rather than 0.45 lb/mmbtu) for boiler no. 4 in order to comply with the generic NO_x RACT requirement.

To evaluate what NO_x RACT might be for boilers 1, 2 and 3 (398 mmbtu/hr wall fired wet bottom boilers), KUC investigated various ways to reduce NO_x emissions. These alternatives along with the respective conclusions that were reached are summarized below.

a. Fuel Switching to low nitrogen coal - ruled out as either infeasible or ineffective

b. Fuel Switching to natural gas - ruled out as not cost effective (on the order of $5,000/ton)

c. Low-NO_x Burners - remained a distinct possibility

d. Overfire Air - rejected because lower flame temperatures would cause problems with slag tapping (remember that these are wet bottom boilers)

e. Staged Air Combustion - infeasible because of the tight burner configuration and short residence time

f. Gas Reburn - also found to be infeasible because of the tight burner configuration and short residence time

g. Flue Gas Recirculation - rejected as infeasible because there is no practical place for flue gas recirculation to be introduced into these boilers

h. Ammonia or Urea Injection - found to provide only marginally better NO_x reduction than low-NO_x burners, with similar capital costs, but significantly higher operating costs. This technique can also present operational difficulties in terms of furnace temperature sensitivity, and in addition may present potential safety hazards.

i. NO_x Scrubbing - may be technically feasible, but would provide no better NO_x reduction than low-NO_x burners at a much greater cost

As identified above, low-NO_x burners remained a distinct possibility. Preliminary estimates suggested that 426.5 ppm, and 216 lb/hr (which is the equivalent of 0.50 lb NO_x per mmbtu) was an attainable and enforceable emission rate for each of these three boilers. This is also the rate identified by EPA as representative of RACT for dry bottom wall fired units in the case of electric utility boilers. Of note is the fact that EPA did not prescribe a level of NO_x RACT for wet bottom "utility" boilers. Because these are wet bottom boilers KUC was somewhat skeptical about the possibility of slag tapping problems, and proposed testing the performance of low NO_x burners in one of the boilers on a trial basis before the State made a final RACT determination.

The State accepted KUC's proposal. An approval order (AO) was issued on May 26, 1994 that required installation of low NO_x burners on all three boilers if the initial tests were successful. The AO established a NO_x emission limitation of 216 lb/hr and 426.5 ppmdv (measured at 3% oxygen) for each of the three boilers, effective after May 31, 1995. The AO stated "If the low-NOx burners fail the initial trial, then the post-May 31, 1995, NO_x limit for Boilers #1, #2, and #3 must be re-evaluated and revised by a subsequent AO."

KUC completed the installation of low-NOx burners in Boiler #3 in October 1994. Testing revealed that slag tapping was not possible until the burners were modified. Once modified, the burners performed acceptably during the limited period of testing time that was available. Preliminary results of the stack test performed on November 14, 1994 indicate that the burners, as modified, meet the emission limits in the approval order. KUC completed the installation of low-NO_x burners in Boiler #2 in March 1995 and in Boiler #1 in October 1995.

Based on the successful results of the initial trial, the NO_x emission limitation of 216 lb/hr and 426.5 ppmdv (measured at 3% oxygen) is established as Reasonably Available Control Technology for Boilers #1, #2, and #3. The limitation is enforceable through the SIP and the approval order dated May 26, 1994, and was effective May 31, 1995, which is the deadline for implementation of NO_x RACT in the Clean Air Act.

Upon review of the information listed in items 1 and 2 above, the State is hereby issuing as part of this SIP revision, a negative declaration, or a statement to the effect that RACT has already been

applied to any facility qualifying as a utility boiler, within the meaning of the RACT determination made by EPA for this source category. This determination was performed on facilities located within the Salt Lake and Davis County nonattainment area. If such sources are found by either the State or by the EPA in the future, the State shall expeditiously develop specific RACT rules for such sources upon their discovery, and shall submit such rules to EPA for approval as specific SIP revisions.

(b) Other NO_x Control Strategies

In addition to the revisions made to accommodate the NO_x RACT requirements of section 182(f) of the Act as it applies to section 182(b)(2), the state has also implemented the following NO_x strategies. These additional controls fulfill the requirement of the generic NO_x RACT rule.

(i) Low Oxides of Nitrogen Burner Technology.

Subsection R307-1-3.1.12 of the Utah Air Conservation Rules, requires sources to install low oxides of nitrogen burners or controls resulting from application of an equivalent technology, as determined by the Executive Secretary, whenever existing fuel combustion burners are replaced, unless such replacement is not physically practical or cost effective. This requirement applies throughout the state, including Salt Lake and Davis Counties.

(ii) PM_{10} SIP Requirements

The existing PM_{10} SIP emission limit requirements for NO_x are contained in Section IX, Part H , and are source specific limitations. These limitations affect sources of NO_x in Salt Lake County and areas of Davis County which impact the Salt Lake nonattainment area. Application of RACT for the PM_{10} SIP addressed sources greater than or equal to 40 TPY rather than the standard of 100 TPY. Although within the context of PM_{10} it is permissible to consider emissions of primary PM_{10} and its precursors (e.g. NO_x or SO_2) on an equal basis for the purpose of obtaining emission offsets, this is an exception to the overall rule. Any major source or major modification requiring offset to attain or maintain the NAAQS for ozone will be required to secure such offset from the same pollutant for which there is a proposed increase.

(5) Permitting of Existing, New, or Modified Sources

R307-1-3 of the Utah Air Conservation Rules, Control of Installations, specifies state requirements for conducting preconstruction review of new sources and modifications to existing sources. It was included in previous SIPs and, therefore, is incorporated by reference into this SIP revision. The rule requires all new or modified sources with a potential to emit any type of air pollutant to submit a Notice of Intent to construct and to obtain a permit from the State if necessary before construction of the source may begin. The permit will require installation of best available control technology.

Because the Salt Lake and Davis County area is currently designated nonattainment for ozone, the nonattainment area "new source review" provisions of the state's permit rule are currently being enforced in addition to the general preconstruction requirements of R307-1-3. These provisions require all new sources with a potential emission rate of 100 tons per year or more of VOC, and 100 tons per year or more of NO_x, and/or CO, as well as existing sources seeking modifications that will increase potential VOC, NO_x, and CO emissions, to adhere to all existing and future "new source review" sections contained within R307-1-3.3. Part C of Title 1 of the Act, Prevention of Significant

Deterioration, which is addressed in R307-1-3.6 will apply to the Salt Lake and Davis County areas after they have been redesignated to attainment rather than the nonattainment area "new source review" requirements. However, the State has already changed its rules to specify "Salt Lake and Davis Counties" as well as "ozone nonattainment areas" in specific sections of the "new source review" rules. Therefore, the Emissions Offset, Emission Statement, and VOC and NO_x RACT rules will continue to apply in Salt Lake and Davis Counties after redesignation. Further, it should be noted that the existing NO_x offset requirements in the PM_{10} nonattainment area, which includes Salt Lake County, apply to any new source or modification of greater than 25 tons/year.

Utah has implemented a new operating permit program that applies to all major sources in the state. A major source in a moderate ozone area or an attainment area is any source with the potential to emit 100 tons/yr of VOC, NO_x or CO. The permit program was submitted to EPA for approval, as required by Title V of the Act, in April of 1994 and received full approval effective July 10, 1995. The new operating permits will incorporate existing applicable requirements, including the requirements of this Maintenance Plan, and will also contain monitoring, recordkeeping, and reporting requirements. The new permit program will impact this redesignation request by improving the State's existing permit program.

(6) Recent Controls that Contributed to Attainment After the Ozone SIP was Adopted

Technical Support Document, Volume 1, Tabs 1.3 and 1.3.a

The number of exceedances of the ozone standard dropped steadily between 1985 and 1991. This improvement in air quality is the result of the ozone SIP that was adopted in 1984, and additional federal emission control requirements. The ozone standard has not been violated since 1991. It is the position of the State, that Salt Lake and Davis Counties did not violate the ozone standard during these years due to a combination of new emission reductions resulting from 1) significant changes in the existing I/M program promulgated in 1991; 2) the clean-up of the Utah Air Conservation Rules pertaining to ozone nonattainment areas as required by the Phase I SIP call; and 3) the new federal Reid Vapor Pressure (RVP) regulations.

(a) Emission Reductions due to I/M Revisions

A major revision of Utah, Davis and Salt Lake County's I/M programs was fully implemented prior to September 1, 1991. Weber County implemented an almost identical I/M program in January of 1992. The revision was made in response to a 1990 legislative mandate that I/M counties use computerized analyzers, standardize their programs, and provide for reciprocity. Major improvements include: the use of BAR90 technology emissions analyzers; the inclusion of vehicles owned by federal agencies, federal employees, and university and college employees and students into the program; an increased fail rate; the exclusive issuance of waivers by I/M technical center staff; a substantial increase in the dollar amount spent on emission-related repairs to qualify for a waiver ($100 for 1981 or older model cars, $200 for 1981 and newer models); automated data management and audit functions; and coverage of more emission control devices by the Salt Lake County anti-tampering program. As a result of separate legislation, the number of vehicles qualifying for exemption from the I/M program because of "farm truck" classification has been reduced. Substantial emission reductions have resulted from these I/M program revisions. A significant increase in enforcement efforts is believed to have brought about reductions in mobile vehicle emissions. The VOC, CO, and NO_x reductions in Salt Lake and Davis Counties due to these revisions have

contributed to attainment of the ozone National Ambient Air Quality Standard (NAAQS), but have not been quantified.

In 1992, the emission reductions due to revisions in the basic I/M program in the two counties accounted for an additional emission reduction of 1.23 tons/day VOC, negligible NO_x, and 17.18 tons/day CO when compared with the I/M program which existed during the 1990 base year.

(b) Emission Reductions Due to the Revision of R307-14

As stated in Section IX.D.2.a, to comply with Phase I of the May 1988 SIP call, numerous deficiencies needed to be corrected and additional requirements added to the existing ozone rules which are included in R307-14 of the Utah Administrative Code. The rulemaking process began in 1989 for these necessary changes, and all rule changes were finally completed and officially submitted to EPA in July 1991. The ozone nonattainment rules became much more stringent for controlling fugitive VOC emissions from: petroleum refineries; gasoline transfer, storage, and loading facilities; degreaser operations; and numerous surface coating operations. The most significant reductions in emissions resulted from the removal of an exemption from the monitoring/repairing requirements of R307-14-4.F for pipes, valves, pumps, and flanges smaller than 3/4" in diameter. The revised rules lead to improved enforcement procedures and source compliance determinations, and resulted in significant reductions in fugitive VOC emissions. The actual emission reductions obtained from revising the rules are difficult to quantify since they are fugitive emissions, the method of calculating reductions is specific to each refinery, and questions are raised as to when the actual reductions were obtained. However, the resulting reductions in VOC emissions from these rule changes are significant and contributed to attainment of the ozone standard.

(c) Emission Reductions Due to Federal Restrictions on Gasoline Volatility

Volatility of a liquid is a measure of its tendency to evaporate. Fuel volatility is most commonly measured in Reid Vapor Pressure (RVP), which is the pressure of the vapor in pounds per square inch (PSI) at 100 degrees F. The higher the RVP, the more emissions to the atmosphere of the fuel's components, including VOCs. Gasoline vapors escape into the ambient air during gasoline marketing, transfer, and vehicle refueling at service stations. Vapors also escape from gasoline storage facilities, service station tanks, and vehicle gas tanks. In addition to evaporative emissions from the gasoline marketing and distribution network, VOC emissions from vehicle tailpipe exhaust increase as gasoline volatility rises.

In response to evidence that VOC emissions were increasing due to higher motor vehicle fuel volatility, EPA promulgated Phase I volatility standards effective in the summer of 1989. Phase I established a volatility limit of 9.5 psi RVP during the hottest summer months (July through August) for ozone nonattainment areas. During this period, the Salt Lake and Davis County nonattainment areas were well below the limit at 8.3 psi. Phase II volatility restrictions became effective in the summer of 1992 and lowered RVP even further to 7.8 psi in Salt Lake and Davis Counties. The Phase II volatility restrictions are factored into the MOBILE5A model, which is used to determine emission factors for the emission inventory, and are reflected in the 1994 emissions inventory.

Since the RVP limitation was imposed by federal law, it is the federal government who insures that RVP is at 7.8 during the ozone season. The State has neither the equipment nor the personnel to perform RVP testing to assist the EPA with enforcement of this regulation; therefore, the State will

rely upon the federal government enforcement of its own requirement to insure that no violations of the RVP limitation occur.

(7) Rule Effectiveness Studies and Small Source Compliance Initiatives

Technical Support Document, Volume 1, Tab 1.4

EPA has established a high national priority on conducting VOC rule effectiveness studies and small source compliance initiatives in ozone nonattainment areas. In recognition of this federal priority, the State has undertaken a R307-14 rule effectiveness study addressing tank truck tightness. This study covered the efficiency of the leak tight testing program in the State of Utah, and the efficiency of the control equipment associated with the tank trucks.

The State has established a Small Business Assistance Program (SBAP). This program helps the small business community in the State to better prepare themselves for future EPA regulations and subsequent rules which the State will implement to enforce those federal regulations. The SBAP assists small businesses to begin the process of coming into compliance with those rules in the future. In recognition of other federal priorities, the State will undertake other activities in cooperation with EPA and local air pollution control agencies as state and local resources allow. Particular attention will be paid to the autobody industry, as well as degreasing, chromium electroplating, and small surface coating operations to determine compliance rates and rule effectiveness.

IX.D.2.c. OZONE MONITORING

Requirement Related to Ozone Monitoring:

- *Three consecutive years of ozone monitoring data must show that violations of the standard are no longer occurring. (A violation of the standard is defined as more than 3 expected exceedances of the 0.12 ppm ozone standard at the same monitoring site over a 3 consecutive year period.)*

(1) Ozone Monitoring Network

Technical Support Document, Volume 2, Tab 2.0

Information concerning ozone monitoring in Utah is included in the Monitoring Network Review (MNR). Since the early 1980's, the MNR has been updated annually and submitted to EPA for approval. EPA personnel have concurred with the annual network reviews, and have agreed that the network is adequate. They have also visited the monitor sites on several occasions to verify compliance with federal siting requirements. The ozone monitoring season in Utah is May through September (40 CFR Part 58, Appendix D, 2.5). The highest ozone values usually occur during June, July and August.

Ozone monitoring of the major urban areas along the Wasatch Front is complicated by the valley setting. Typical ozone monitoring at sites on flat terrain, in wide open spaces, indicates that the peak ozone stations should be located 5 to 7 hours down wind from the urban area. Because Salt Lake and Davis Counties have a large body of water on the west side, and a major mountain range on the east side, summer wind patterns in those counties result in a diurnal on-shore/off-shore wind flow. This pattern suggests that after 5 to 7 hours the polluted air mass may return to the urban area where the ozone precursors originated.

The following ozone monitoring stations were operating in Salt Lake and Davis Counties during the period 1985 through 1996:

1). Salt Lake City (AIRS ID number 49-035-3001). This site is designed to measure population exposure to ozone (O_3). It is located at the edge of the Salt Lake Central Business District (CBD) adjacent to residential neighborhoods. This site was permanently closed down on October 26, 1994.

2) Cottonwood (AIRS ID number 49-035-0003). This site was determined, based on wind trajectories, to be the site which would measure the maximum O_3 concentration in the Salt Lake area. It is located in a residential area, approximately nine miles south of the CBD center.

3) Bountiful (AIRS ID number 49-011-0001). This site is located in a residential area in Bountiful, within one block of the main street. It has historically reported the highest ozone concentrations in the O_3 network. High readings at this site may be a result of the close proximity of several oil refineries (major VOC, CO, and NO_x

sources) in the area. Ozone concentrations appear to return in the afternoon to locations where the precursors were generated in the morning.

4) Beach (AIRS ID number 49-035-2004). This site is located at the Great Salt Lake Marina, close to the western border of Salt Lake County. The site has been in existence for many years to measure PM_{10} and SO_2. Ozone monitoring equipment was added to the site as a result of the ozone saturation study which showed high concentrations of ozone in this area. The ozone monitoring equipment began operating 5/17/94.

5) Herriman (AIRS ID number 49-035-3003). This site is located in the southwest corner of the Salt Lake Valley in a predominantly rural area. The site was added as a result of the ozone saturation study which showed high concentrations of ozone in this area. The ozone monitoring equipment began operating 5/1/94.

The Salt Lake City monitoring site was permanently closed down on October 26, 1994 because remodeling at the Salt Lake City County Building prevented accurate measurements at the site. The Division of Air Quality has reviewed the existing monitoring network, and determined that a new site is not needed. The monitoring sites added due to the ozone saturation study, in conjunction with the existing network are adequate to monitor ozone concentrations in the nonattainment area.

Figure 1 contains a map of the existing Salt Lake/Davis ozone nonattainment area showing the locations of the monitors listed above. The State and Local Air Monitoring Stations /National Air Monitoring Stations report is contained in the TSD.

(2) Additional Monitoring

Technical Support Document, Volume 2, Tabs 2.1, 2.1.a, and 2.1.b

EPA requested that the State re-evaluate the existing ozone monitoring network because of the increased population shown by the 1990 census, and to demonstrate that all ozone monitoring sites along the Wasatch Front are at locations where the highest ambient ozone concentrations occur. The State and an independent contractor conducted an ozone saturation study during the summer of 1993 along the Wasatch Front (Weber, Davis, Salt Lake, and Utah Counties), and ozone data were collected for the purpose of determining the following:

1) the location of the highest ozone concentration impact along the Wasatch Front;
2) whether the currently operated ozone monitors are appropriately located;
3) where two new monitoring sites should be permanently located; and
4) if there are other sites where ozone should be monitored.

The field work for the study was conducted between July 15 and August 15 of 1993. The Wasatch Front Saturation Study Protocol document and the final report from the independent contractor are included in the Technical Support Document.

Based on the results of the Wasatch Front Saturation Study, the State installed two new monitors in the ozone nonattainment area in 1994, the Beach and Herriman sites.

The State performed a second ozone saturation study during the summer of 1994 to verify the results of the 1993 study. The year 1993 was an unusually cold year, and the second study determined whether the cool weather affected the results of the study. The sampling occurred during July and August of 1994. The results of this second study compare well with the first study and support the changes that have been made in the ozone monitoring network.

(3) Ambient Ozone Monitoring Data

Technical Support Document, Volume 2, Tabs 2.2 through 2.2.h

In response to the 1977 Clean Air Act amendments the EPA revised the federal ambient air quality standard for ozone from 0.08 ppm to 0.12 ppm. Each monitoring site is allowed three expected exceedances of the standard in three years. More than three expected exceedances in that three year period is a violation. In other words, the entire ozone planning area is considered in violation of the standard if a single monitor records 1.1 or more expected exceedances per year averaged over a three year period. The term "expected exceedances" accounts for the possibility of missing data. Missing data can occur when a monitor is being repaired, calibrated, or is malfunctioning, leaving a time gap in the monitored readings. EPA discounts these gaps if the highest recorded ozone reading at the affected monitor on the day before or after the gap is not more than 75 percent of the standard, and no measured exceedance has occurred during the ozone season. However, data gaps that fail the 75 percent test once a measured exceedance has occurred are mathematically included in EPA's calculation of "expected exceedances" of the ozone standard.

Expected exceedances are calculated from the Aerometric Information and Retrieval System (AIRS) ozone data base according to procedures contained in 40 CFR Part 50, Appendix H. The State relied on the expected exceedance values contained in the AIRS Quick Look Report (AMP 215) to determine if a violation of the standard had occurred. Based on the report, the Salt Lake/Davis County nonattainment area attained the ozone standard in 1992 and has remained in attainment through 1996. See Figure 2 and Table 5.

(4) Ongoing Review of Monitoring Sites

Technical Support Document, Volume 2, Tabs 2.3, 2.3.a, and 2.3.b

Even after redesignation of Salt Lake and Davis Counties to attainment for ozone, the State commits to continue operating the existing ozone monitoring sites in Salt Lake and Davis Counties according to all applicable federal regulations and guidelines. The State will revaluate the network annually to determine whether new monitoring sites are needed or whether existing monitoring sites should be removed or relocated.

Figure 1

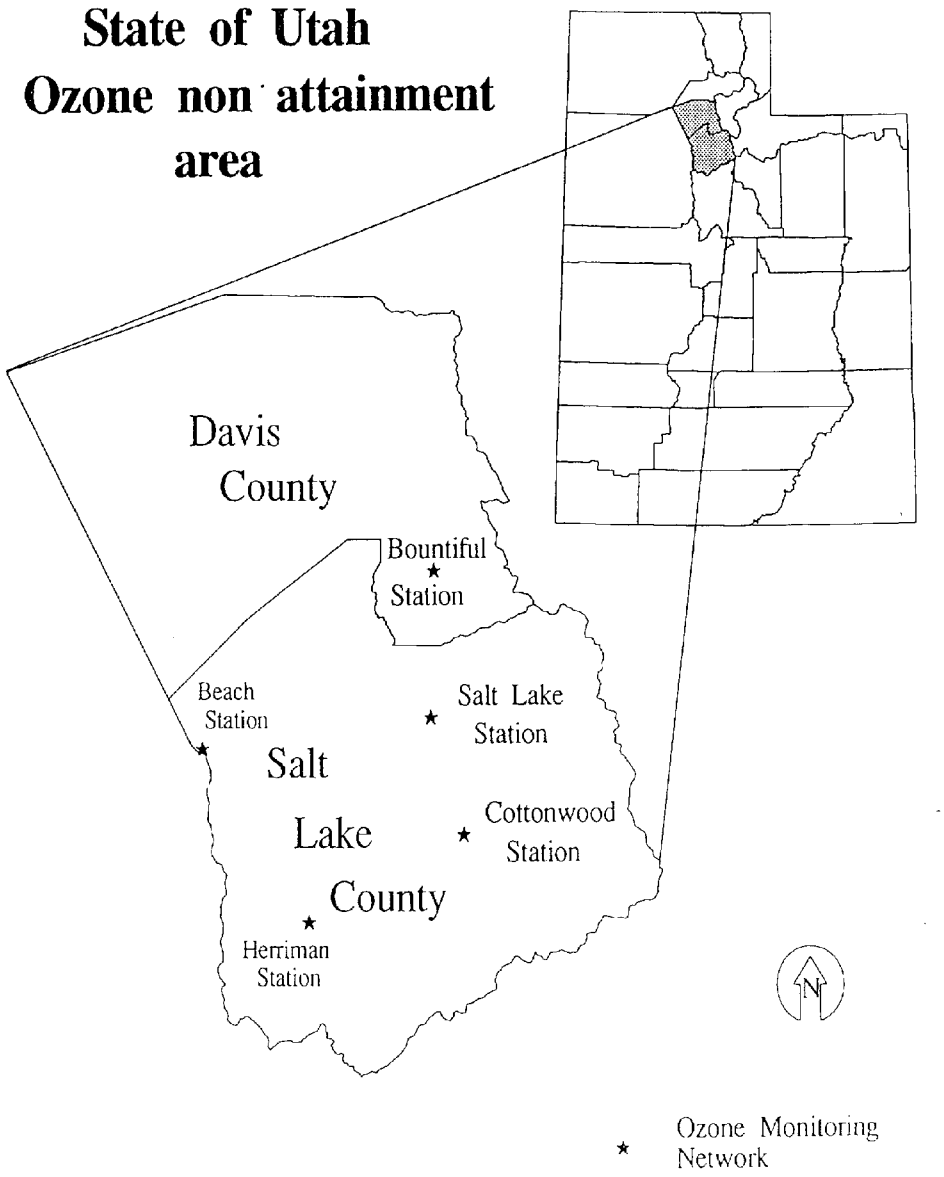

State of Utah
Ozone non attainment area
Davis County
Bountiful Station
Beach Station
Salt Lake Station
Salt Lake County
Cottonwood Station
Herriman Station
N
Ozone Monitoring Network

Figure 2. **3-Year Average Expected Exceedances, Showing Attainment of the 0.12 ppm Ozone Standard (1.0 Expected Exceedances, 3-Year Average)**

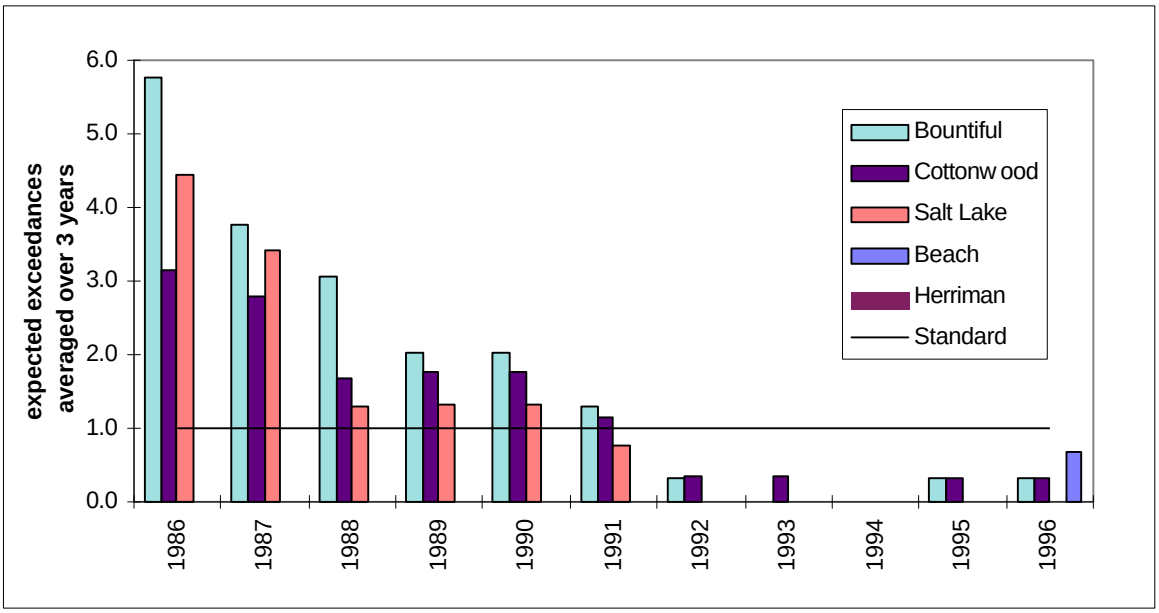


Table 5. Expected Exceedances of the 0.12 ppm Ozone Standard

	Expected exceedances averaged over 3 years				
	1992	**1993**	**1994**	**1995**	**1996**
Beach	n/a	n/a	n/a	n/a	0.7
Bountiful	0.3	0.0	0.0	0.3	0.3
Cottonwood	0.4	0.4	0.0	0.3	0.3
Herriman	n/a	n/a	n/a	n/a	0.0
Salt Lake City	0.0	0.0	0.0	n/a	n/a

IX.D.2.d VERIFICATION OF AIR QUALITY IMPROVEMENTS

Requirements Related to Verification of Air Quality Improvements:

- *The state must verify that the improvement in air quality is due to permanent and enforceable reductions in emissions.*

- *Stationary, area, and mobile source emission data must be examined for evidence of economic down-turn that may have contributed to attainment, and if appropriate, the State must assure that recovery from the down-turn will not jeopardize continued maintenance of the standard.*

(1) Demonstration that Air Quality Improvements are Permanent and Enforceable

(a) Enforceable Emission Reductions

The improvement in air quality already achieved in Salt Lake and Davis Counties has resulted from implementation of the emission controls listed below. Because these controls have been either federally approved or are pending federal approval, the resulting VOC, NO_x, and CO emission reductions are federally enforceable. This plan includes a state commitment to continue to enforce all applicable requirements of past revisions to the State Implementation Plan, even after the Salt Lake and Davis County areas are redesignated to attainment. This commitment, detailed in Section IX.D.2.b, makes permanent the emission reductions achieved from these requirements. The emission impacts of the controls listed below have been accounted for in completing the VOC, NO_x, and CO emission inventories for these maintenance provisions to the SIP.

1) Existing RACT controls on stationary sources covered by CTGs in categories I, II, and III, as well as RACT controls on existing major non-CTG sources of VOCs.
2) The Federal Motor Vehicle Emission Control Program.
3) The Federal Gasoline Volatility Control Program (Phase II).
4) Basic I/M Program with improvements.

A continued improvement to air quality through the year 2007 for Salt Lake and Davis Counties will result from the following emission controls which have been promulgated, or may be implemented as a result of the requirements of the 1990 Clean Air Act Amendments. These control requirements will produce VOC, NO_x, and CO emission reductions that are permanent and federally enforceable.

1) Continuation of the Federal Motor Vehicle Emission Control Program, and particularly the implementation of the Tier II controls. The Federally enforced program limits emissions from new motor vehicles manufactured or approved for sale in the United States.
2) Continuing enforcement of existing R307-14 rules covering VOC controls and basic I/M with improvements.
3) New requirements covering New Source Review, NO_x RACT, VOC RACT, and Emission Offsets.
4) Requirements for sources covered in the Emission Statement.

5) The development and implementation of new Control Technology Guidance (CTGs) and Maximum Available Control Technology (MACT) required by Title III of the Clean Air Act Amendments.
6) Implementation of improvements to the I/M programs in Salt Lake and Davis Counties..

Items 1 through 5 above have been implemented in the Salt Lake and Davis County areas and are discussed in greater detail in Section IX.D.2.b. Item 6 is discussed in more detail in Section IX.D.2.g. of this maintenance plan.

(b) Meteorology and Ambient Concentration

Technical Support Document, Volume 2, Tab 2.4

For redesignation of the Salt Lake/Davis County ozone nonattainment area to attainment, it becomes important to show that reductions in ambient ozone concentrations are due to permanently enforceable emission reductions, and not to reductions resulting from year-to-year meteorological variations. Ozone photochemical reactions are forced primarily by strong solar intensity (equated to high temperature), and stable wind conditions.

The numbers contained in Table 6 were obtained from National Weather Service records compiled from data collected from 1985 through 1995 at the Salt Lake International Airport, which is centrally located inside the nonattainment boundaries. Table 6 compares the average high temperature, number of days above 90^{o} F, the average wind speed, and the number of measured exceedances for each month for the Utah ozone monitoring season (May - September) for the years 1985 through 1995. Meteorological numbers were averaged for July and August for each year, since typically the highest measured ozone concentrations occur during these two months. Ozone exceedance values were measured at monitoring sites within Salt Lake and Davis Counties.

A comparison of the number of days over 90^{o} does not show a change in meteorological patterns at the time Salt Lake and Davis Counties began to show attainment of the ozone standard in 1992. There were hot and cold years before and after 1992. 90^{o} F was selected based on a temperature versus ozone exceedance comparison at the Salt Lake City station for 1985 through 1992. Wind speed also exhibits fairly uniform variability throughout the same period.

An attempt was made to use a larger data base for both exceedance and non-exceedance days to make further comparisons between the years. This comparison was based on 15 exceedance days (during the period 1985 through 1988) and 9 non-exceedance days from 1989 (non exceedance days had measured O_3 concentrations between 0.090 and 0.120 ppm), but was limited to temperature only. Graphs found in the Technical Support Document suggest that the 1989 ozone season was not significantly different from the 1986 and 1988 seasons. The graphs show that the average 1989 temperature was well within ± 1 standard deviation from the mean 1986, 1988 temperature. The State again suggests that meteorological variables did not significantly influence the reduction of ambient ozone concentrations in Salt Lake and Davis Counties.

(2) Assurance That Baseline Point Source Emission Data Have Not Been Influenced By Temporary Local Economic Downturn

Technical Support Document, Volume 2, Tab 2.5

EPA requires the State to demonstrate that point source VOC, NO_x, and CO emissions for Salt Lake and Davis Counties are not artificially low due to a temporary local downturn. Economic recovery from a downturn could lead to a larger than projected increase in VOC, NO_x, and CO emissions contributing to an exceedance of the ozone standard. The State has examined historical and projected employment data for Salt Lake and Davis Counties by looking at statistical projections for 1980 through 2020 that have been published by the Utah Office of Planning and Budget. These statistics show relatively stable manufacturing employment, as well as projected increases in population in Salt Lake and Davis Counties from 1994 to 2007. Because manufacturing employment is an indicator of economic stability for pollutant emitting industries, the State has concluded that economic downturn did not and will not artificially depress point source VOC, NO_x and CO emissions during the period between 1994 and 2007.

Table 6. Temperature and Windspeed Comparison from 1985 to 1995, and Corresponding Measured Ozone Exceedances (source: National Weather Service)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
May											
Avg. High (F)	75.9	69.2	74.8	72.8	73.0	71.0	66.5	78.6	75.1	76.2	66.0
# Days > 90 (F)	0	0	0	1	0	0	0	0	0	0	0
Avg. Wind Speed (mph)	11.0	10.0	10.2	10.7	10.2	10.5	9.5	9.1	9.2	9.0	8.5
June											
Avg. High (F)	86.0	86.9	85.9	90.1	83.3	86.2	80.8	84.4	75.8	89.5	77.1
# Days > 90 (F)	13	12	9	17	7	12	6	9	3	16	3
Avg. Wind Speed (mph)	9.7	10.5	9.2	10.6	9.1	10.3	9.9	9.8	9.0	9.4	9.2
July											
Avg. High (F)	94.1	87.2	89.2	90.6	96.3	92.6	93.2	89.3	83.6	96.5	90.7
# Days > 90 (F)	23	11	15	28	28	23	24	18	6	27	21
Avg. Wind Speed (mph)	9.8	10.5	11.0	9.1	9.9	10.1	9.3	9.6	8.9	8.7	9.2
August											
Avg. High (F)	90.5	90.7	88.6	91.1	89.3	90.0	91.7	91.5	86.6	95.3	92.6
# Days > 90 (F)	20	18	18	21	18	17	21	22	7	28	25
Avg. Wind Speed (mph)	10.9	9.5	10.1	8.8	10.3	9.5	9.7	9.8	9.6	10.0	9.8
September											
Avg. High (F)	74.4	71.0	81.1	73.3	80.9	85.1	76.5	80.9	79.4	84.4	81.4
# Days > 90 (F)	1	3	2	8	3	11	4	2	3	6	6
Avg. Wind Speed (mph)	10.7	9.8	9.3	9.1	10.1	9.1	7.4	9.1	8.0	10.0	8.2
July/August											
Avg. High (F)	92.3	89.0	88.9	90.9	92.8	91.3	92.5	90.4	85.1	95.9	91.7
Total # Days > 90 (F)	43	29	33	49	46	40	45	40	13	55	46
Avg. Wind Speed (mph)	10.4	10.0	10.6	9.0	10.1	9.8	9.5	9.7	9.3	9.4	9.5
Number of Measured Exceedances											
Beach	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	1
Bountiful	4	6	1	2	2	1	0	0	0	0	1
Cottonwood	5	2	0	3	2	0	1	0	0	0	1
Herriman	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0
Salt Lake City	8	2	0	1	2	0	0	0	0	0	n/a
Total	17	10	1	6	6	1	1	0	0	0	3

IX.D.2.e. ATTAINMENT EMISSION INVENTORY - 1994

Requirements relating to Attainment Emission Inventory:

- *The state can choose to demonstrate maintenance of the NAAQS using an emissions inventory approach. This approach requires the development of an "attainment emission inventory" to identify the level of emissions in the area which is sufficient to attain and maintain the standard.*

- *The attainment emission inventory should be consistent with EPA guidance, and should include emissions during the time period associated with the monitoring data showing attainment.*

The 1994 attainment emissions inventory was prepared using the methodology that had been used for the 1990 base year inventory. The 1990 base year inventory has been submitted to EPA, and approval is still pending. The 1990 base year inventory is incorporated by reference into this maintenance plan.

The emissions inventory is divided into three major sections: point sources, area sources, and mobile sources. A discussion of each of these three sections follows. Summary tables, showing VOC, NO_x, and CO peak ozone season daily emissions in tons/day for Davis and Salt Lake Counties, are included as Table 7.

(1) Point Source Emissions Inventory

Technical Support Document, Volumes 8, 9, 10, and 11

Point source estimates of VOC, NO_x and CO emissions were based on questionnaires sent to Part 70 sources and sources permitted for more than 10 ton/yr of VOC within the Salt Lake City/Ogden Metropolitan Statistical Area (MSA). In accordance with EPA guidance on rate of progress inventories and projection inventories, stationary sources within the 25 mile boundary surrounding the MSA were not included in the 1994 attainment year inventory for purposes of redesignation.

As part of the 1994 inventory submittal, VOC sources within the nonattainment area were required to fulfill the emission statement requirements as listed in Utah Air Conservation Rule R307-1-3.5.4. This included ozone season (June 1 - August 31) activity levels and operating schedules. This information was used to calculate ozone season daily emissions of VOC, NO_X, and CO. An example of such calculations can be found in the 1994 attainment emission inventory TSD. If specific seasonal activity was not available, the method shown on page 27 of the Inventory Preparation Plan was used. This method involves converting annual emission rates to a daily rate by using a source's operating schedule.

The sources included in the point source portion of the attainment year (1994) inventory include all stationary sources with actual emissions of 10 ton/year or more of VOC, and/or 100 ton/year or more of NO_x and/or CO. Stationary sources with 1994 actual emissions less than 10 ton/year of VOC or less than 100 ton/year of NO_x or CO were considered a part of the area source portion of the inventory for Salt Lake and Davis Counties. The mobile-source emissions, such as haul trucks and bulldozers, that were reported by industries in their emission inventories are included in the non-road section of

the 1994 emission inventory. The 1994 emissions inventory for stationary sources, with the exception of the Salt Lake City International Airport, are based on actual activity levels and reflect actual estimated emissions.

The 1994 point source emission estimates reflect control measures that are already implemented. In accordance with EPA guidance, 1994 attainment year emissions were adjusted to incorporate an 80 percent rule effectiveness assumption wherever applicable, for point sources controlled under state VOC, NO_x and CO rules. Rule effectiveness is a measure of the ability of the regulatory program to achieve all of the emission reductions possible by full compliance with applicable rules at all covered sources, at all times. It reflects the assumption that rules are not typically 100 percent effective at all times. The State will conduct rule effectiveness studies to verify the compliance rate in Utah for various rules as resources allow and will change the emissions inventory to reflect the results of those studies.

(2) Area Sources

Technical Support Document, Volume 5, Tabs 2 through 2.13.5

The area source inventory estimates VOC, NO_x, and CO emissions by county. This inventory includes sources whose emissions from any single source location are 10 TPY or less for VOC and 100 TPY or less for NO_x and CO. The area source inventory was examined for double-counting of emissions already included in the state's point source inventory and adjusted accordingly. All emission estimates in the area source inventory were reported in tons per peak ozone season day to reflect conditions most typical of higher ozone concentrations.

Area source emissions include small stationary sources such as gasoline stations and degreasing operations that are controlled through VOC regulatory rules. In compliance with EPA guidance, emission estimates for area sources covered by existing rules were adjusted to reflect a rule effectiveness factor of 80%. In the case of the rule effectiveness study completed by the State which covered gasoline transport vehicles, a factor of 95% was used. VOC, NO_x, and CO emissions from motor vehicle tailpipe emissions and refueling are included in the mobile source inventory. VOC emissions from vehicle refueling are included in the area source emissions inventory.

(3) Mobile Sources Emissions Inventory

Technical Support Document, Volume 6, Tabs 3 through 3.2.3

Mobile sources are divided into two categories: on-road and non-road sources. Emissions from on-road mobile sources include all VOC, CO, and NO_x from automobiles, trucks, and motorcycles designed for travel on established federal, state, or local roads. Calculated emissions from these vehicles are in the form of tailpipe exhaust, evaporation from the engine and fuel systems, and any other vapor losses during the running and resting of the vehicles. Vapor losses from fuel tanks, after filling the tank at a refueling station, are attributed to this category.

Emissions from non-road mobile sources include tailpipe exhaust, evaporation from the engine and fuel systems, and any other vapor losses during the operation of railroad locomotives, airplanes, and recreational, construction, lawn and garden, and any other portable petroleum-fueled equipment.

(a) On-Road Emissions

The on-road emissions inventory was generated by combining VOC, NO_x, and CO emission factors with estimates of average summer weekday vehicle miles of travel (VMT) within Salt Lake and Davis Counties. The calculated on-road mobile emissions shown here are aggregated by county for a *peak ozone day*. The details of how the emission estimates for the on-road mobile source inventory were calculated are in the Technical Support Document.

The emission factors were derived from the EPA's mobile sources computer model, MOBILE5A_H, which provides emission factors for active and passive aspects of vehicle ownership including evaporative losses from fuel lines, gaskets, connections, fuel tank leakage, engine block cooling, and tailpipe exhaust. MOBILE5A_H incorporates the current federal tailpipe standards as well as those required in the Clean Air Act, and allows users to input local parameters for vehicle control programs already in place or planned for the future. Rule effectiveness factors for on-road mobile sources are built into the MOBILE5A_H files and are reflected as settings within the body of the MOBILE5A_H input files.

All MOBILE5A_H parameters involving inspection and maintenance (I/M) and the anti-tampering programs (ATP) were measured, estimated, or confirmed by the Salt Lake County and Davis County Health Departments, who oversee these programs within their respective jurisdictions.

In August 1995, Utah Department of Transportation (UDOT) staff issued a report entitled *1994 VMT by County, City and Functional Class*. This summary report which tabulates actual Vehicle Miles Traveled (VMT) in average annual daily traffic, uses the Highway Performance Monitoring System (HPMS) database and itemizes VMT occurring on each of 12 functional roadway classes in each city and county within the state. In order to be consistent with Wasatch Front Regional Council (WFRC) roadway classes (utilized later in the Projections Inventory) which are based on lane number rather than functional use, UDOT's twelve classes were summarized and reassigned into three classes: freeway, arterial & collector, and local roads. The annual average daily VMT were adjusted to typical summer weekday VMT using conversion factors provided by the WFRC. The conversion factors and methods are explained in the Technical Support Documentation for on-road mobile sources.

Since the HPMS model does not attempt to estimate vehicle speeds, the WFRC supplied vehicle speed estimates for 1994 using recent population, employment, travel, and congestion measurements and projections.

(b) Non-Road Emissions

Emissions from non-road mobile sources include releases from railroad locomotives, airplanes, recreational, construction, lawn and garden, and any other non-road petroleum-fueled vehicle or equipment.

i. Trains

The two railroad companies operating within Salt Lake and Davis Counties submitted reports of their 1994 locomotive activities. Line-haul activity was reported in terms of fuel usage and yard activity was reported in terms of number of yard locomotives. These data were combined with emission factors published in EPA's "Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources" (EPA-450/4-81-026d revised) to estimate *peak ozone day* emissions.

ii. Aircraft

The WFRC studied and summarized the airport activity of commercial and private aircraft at each airport within the nonattainment area. Their reports presented landing and take off (LTO) counts within specific aircraft types. To further refine commercial aircraft emissions, the publication *Airport Activity Statistics of Certificated Route Air Carriers* provided an itemized list of aircraft makers, models and the number of flights. With the assistance of the EPA's FAEED software package, emissions of VOC, CO, and NO_x per LTO were calculated. The results were summed to produce *peak ozone day* emissions.

iii. Other Non-Road Engines

This section presents the 1994 attainment year inventory of emissions from non-road engines other than trains and airplanes. Emissions were estimated for each of 79 non-road engine categories and then totaled.

Emissions from non-road engine categories associated with the construction, manufacturing, mining and agricultural industries were based directly on 1994 employment figures for those industries. Estimated emissions from all other engine categories were linked to 1994 general population figures for Salt Lake and Davis Counties.

A study of the relationship between general population figures and non-road engine emissions was undertaken by Energy and Environmental Analysis, Inc. (EEA), who evaluated 33 nonattainment areas, including Denver. There were no Utah ozone nonattainment areas included in the EEA study. Commercial and public records were accessed by EEA to compile one inventory, and a second inventory was developed from confidential records. A reasonably close correlation was found between the two inventories. Excluding the engine categories for which employment statistics were used, the state took an average of the two EEA inventories for the remaining categories from the Denver area and scaled the results down to match the smaller population in Salt Lake and Davis Counties.

Emissions from non-road mobile equipment operated at Kennecott's Barney's Canyon Mine, Hill Air Force Base and Kennecott's Bingham Canyon Mine, three major point sources in the Salt Lake and Davis Counties nonattainment area, were added to the inventory since these sources represent a unique contribution to the inventory not accounted for in EEA's study of the Denver area.

(4) Biogenic Emissions

Technical Support Document, Volume 7

Biogenic emissions are natural VOC losses from forests, field crops, and all other plant matter growing or decomposing within the nonattainment area. The biogenic portion of the emissions inventory was originally done for Salt Lake and Davis Counties by the EPA's Emission Inventory Branch in Research Triangle Park, North Carolina. Because biogenics account for a significant portion of the total VOC inventory in the ozone nonattainment area, the Division of Air Quality re-modeled the biogenic emissions estimates. For this process, the EPA model PC-BEIS was used. However, the land-use database and the meteorological data were modified to reflect more accurate estimates of the nonattainment area. The results show a 31% reduction in biogenic emissions from the EPA's original estimate. A full description of the process, modifications, and logic of this analysis are included in the technical support document.

Information specific to the Salt Lake and Davis County nonattainment areas was entered into the PC-BEIS model defining the location (latitude and longitude), time (day-month-year for a typical ozone day), and meteorology (temperature, wind speed, relative humidity, and cloud cover). The documentation for the PC-

BEIS model defined the procedure for the selection of the modeling day. The modeled day was a typical ozone day, selected from the period 1988 through 1990. The typical ozone day is the fourth-highest temperature day out of the top ten ozone days from this three year period. Meteorology for this day was collected and used for Salt Lake County, and then repeated for Davis County.

Table 7. **Salt Lake and Davis County Category Totals for VOC, CO and NOx in Tons/Day**

VOC EMISSIONS (TON/DAY)	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
area	40.81	42.96	43.77	44.74	45.70	46.75	47.82	48.82	49.88	51.04	52.23	53.46	54.65	55.85
non-road	33.16	33.82	33.33	32.12	31.23	30.88	30.91	31.12	29.71	28.35	27.00	25.64	24.25	22.81
on-road	75.66	74.25	70.02	69.35	66.29	63.52	62.19	60.96	60.56	59.65	58.99	58.06	58.43	58.69
point	12.25	12.77	13.03	13.27	13.48	13.70	13.93	14.18	14.43	14.68	14.93	15.18	15.42	15.63
biogenics	38.94	38.94	38.94	38.94	38.94	38.94	38.94	38.94	38.94	38.94	38.94	38.94	38.94	38.94
total	**200.83**	**202.74**	**199.10**	**198.41**	**195.64**	**193.80**	**193.79**	**194.02**	**193.53**	**192.65**	**192.09**	**191.28**	**191.69**	**191.92**
attainment	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*	*200.83*

CO EMISSIONS (TON/DAY)	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
area	4.87	9.98	10.06	10.13	10.21	10.29	10.37	10.45	10.54	10.64	10.74	10.84	10.94	11.05
non-road	292.68	298.94	303.25	308.06	312.28	317.27	322.66	327.94	333.62	339.79	346.26	352.88	359.76	366.70
on-road	637.04	600.45	566.14	547.28	507.70	466.13	445.19	422.22	421.25	407.18	394.09	389.62	389.12	394.09
point	3.68	3.70	3.77	3.84	3.90	3.97	4.03	4.11	4.18	4.25	4.33	4.40	4.47	4.53
total	**938.27**	**913.07**	**883.22**	**869.31**	**834.08**	**797.66**	**782.26**	**764.72**	**769.60**	**761.86**	**755.41**	**757.74**	**764.29**	**776.37**
attainment	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*	*938.27*

NOX EMISSIONS (TON/DAY)	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
area	7.22	7.54	7.67	7.81	7.93	8.06	8.21	8.35	8.50	8.66	8.83	9.00	9.18	9.36
non-road	50.39	50.70	50.63	51.12	50.44	49.87	49.47	49.22	48.97	48.72	48.52	48.33	48.44	48.64
on-road	74.11	74.27	72.53	71.97	69.01	65.80	65.11	64.72	64.62	64.46	65.13	65.95	66.85	67.75
point	27.72	22.96	24.52	24.96	25.31	25.71	26.14	26.61	27.08	27.55	28.02	28.49	28.99	29.45
total	**159.45**	**155.47**	**155.35**	**155.86**	**152.69**	**149.44**	**148.93**	**148.90**	**149.17**	**149.39**	**150.50**	**151.78**	**153.46**	**155.20**
attainment	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*	*159.45*

IX.D.2.f FUTURE AIR QUALITY PROJECTIONS

(1) Projected Emission Inventory, 1994 - 2007

Requirement Relating to Projected Inventories:

> - *Projection inventories must be completed that show the standard can be maintained in the future (i.e. for ten years after redesignation), especially noting whether future increases in VOC, NO_x, and CO emissions are expected and can be accommodated without additional controls, or whether new controls need to be implemented to insure maintenance of the standard.*

The attainment emission inventory reported above in Section IX.D.2.e documents a level of emissions in the Salt Lake/ Davis County area which is sufficient to maintain the NAAQS for ozone. Emissions projections for each source category are used to determine if expected emission levels in future years will exceed the 1994 attainment emission inventory level. Maintenance of the NAAQS is demonstrated if the projected emissions remain below the 1994 level.

The projection emissions inventory is divided into three major sections: point sources, area sources, and mobile sources. A discussion of how emissions were projected for each of these three sections follows. Figures 3 through 5 graphically demonstrate that the emission inventory remains below the 1994 level through the year 2007. Summary tables, showing VOC, NO_x, and CO peak ozone season daily emissions in tons/day, are included in the TSD.

(a) Point Sources

Technical Support Document, Volume 16, Tabs 7 through 7.2

EPA guidance establishes accepted methods of projecting emissions from point sources. EPA-452/R93-002, "Guidance for Growth Factors, Projections, and Control Strategies for the 15 Percent Rate-of-Progress Plan", outlines criteria for the use of actual and allowable emissions in projected inventories. Actual emissions from a source are the emissions reported based on actual operating hours, production rates, and control equipment for the processes carried out at the source. The 1994 attainment emissions inventory is based on actual emissions. Allowable emissions are based on the regulatory element of the source's operating permit, or Approval Order, which represents a regulatory limit on emissions from the source.

When allowable emissions are used in projection inventories, the guidance document cited above recommends that an allowable emission limit be calculated for the source based on the regulatory emission limit multiplied by an expected level of activity. It is important to note that allowable projections are not fully allowable emissions; i.e., allowable emissions are the allowable emissions limit multiplied by the maximum theoretical activity level.

The use of actual emissions is limited to certain circumstances. For sources or source categories that are currently subject to Approval Order regulation and the State does not anticipate subjecting the source(s) to additional regulation (i.e., a new or modified Approval Order is not pending), the projected emissions may be based on actual emissions. Actual emissions may also be used for sources or source categories which are unregulated and for which no future regulation is anticipated. For sources that are expected to be subject to

new regulation or a new Approval Order, the projections are to be made using allowable emission limits based on the new allowable emissions.

Both actual and allowable emissions have been used in this Maintenance Plan's projected inventories. The activities at major point sources were evaluated to determine whether actual or allowable emissions, or some combination of the two, should be used. Evidence of those evaluations is provided in the TSD in the form of letters submitted to the State by sources which note that a meeting was held in which the EPA guidance was reviewed and future plans of the source were discussed. The result of those evaluations and a summary of emissions selected for use in projections is contained in the TSD.

Employment growth factors from the *State of Utah Economic & Demographic Projections 1994* are used to project point source emissions. The growth factors begin in 1995 and are incorporated into the projected emissions until a source is predicted to reach 100% of its NO_x allowable limit, if a limit exists. Once the limit is reached, emissions are projected to remain flat. VOC and CO projected emissions change in proportion with NO_x projected emissions. Kennecott Utah Copper is an exception, because NO_x emissions are affected by new NO_x RACT requirements that do not affect the other pollutants. In this case, NO_x projections decrease, while VOC and CO increase.

The projected VOC, NO_x and CO emissions are demonstrated to remain below the 1994 attainment year emissions level. The accuracy of these projections is reinforced by the maintenance of existing rules (R307-14, *Utah Administrative Code*) which continue to apply to sources in Salt Lake and Davis Counties and regulate the operational practices of VOC sources. The NSR and Offset rules which cover any new sources or modifications to existing sources also reinforce emission projection accuracy.

The 1994 attainment year and projection year VOC, NO_x and CO daily emissions for individual point sources are summarized in the TSD. The point source attainment year inventory contains a listing of emissions by individual sources that compose each plant's actual emissions.

(b) Area Sources

Technical Support Document, Volume 14, tabs 5 through 5.12

Growth factors for estimating projection year emissions were based on population and sector-specific employment growth derived from the Office of Planning and Budget's *State of Utah Economic & Demographic Projections 1994*, in conformance with EPA guidance on preparing area source inventories for ozone planning.

(c) Mobile Sources

Technical Support Document, Volume 15, Tabs 6 through 6.2.3

(i) On-Road Emissions

The on-road projected emissions were generated by combining VOC, NO_x and CO emission factors with estimates of summer weekday vehicle miles of travel (VMT) within Salt Lake and Davis Counties. The *peak ozone day* emissions are aggregated by county for each pollutant. The details of how the emission estimates for the on-road mobile source inventory were calculated are in the Technical Support Document.

The emission factors were derived from the EPA's mobile sources computer model, MOBILE5A_H, which provides emission factors for active and passive aspects of vehicle ownership including engine block cooling, and tailpipe exhaust. MOBILE5A_H incorporates the current federal tailpipe standards as well as those required in the Clean Air Act, and allows users to input local parameters for vehicle emissions control programs already in place or planned for the future. It was presumed that the actual post-1997 vehicle inspection and maintenance (I/M) programs would be implemented as specified in Section X of the State Implementation Plan, Automotive Inspection and Maintenance Program. The on-road mobile emission factors were created by simulating a composite model of each county's planned improvements to their I/M programs. The I/M program for Davis County was simulated using some conservative simplifications because their actual program is difficult to model using MOBILE5A_H.

The Wasatch Front Regional Council is the officially-recognized metropolitan planning organization (MPO) covering the two-county nonattainment area, and the preferred source to estimate future VMT and speeds. The WFRC provided 1994 through 2020 estimates (in approximate 10-year increments) using a full array of local activity conditions including their knowledge of current and upcoming roadway improvement projects, land-use planning policies, historic vehicle movement data, population and employment distributions, and other demographic statistics. Straight-line interpolation was used to obtain VMT estimates for the intervening years. The VMT and speed estimates were furnished solely within the context of one future scenario: the "Build" scenario of WFRC's adopted Long Range Transportation Plan, which has met current conformity requirements and been approved by the Federal Highway Administration (FHWA). The "build" scenario is based on construction of all projects identified in the Long Range Transportation Plan (LRTP) while the "no-build" scenario is based on minimal construction typically comprised of safety and maintenance projects. The conversion factors and estimation methods are explained in the Technical Support Documentation for on-road mobile sources.

Again, since the HPMS does not attempt to estimate vehicle speeds, the WFRC's vehicle speeds (for all years, 1994 through 2007) were also used.

(ii) Non-Road Emissions

(A) Trains

Growth factors for estimating projection year emissions were based on industrial employment growth derived from the Office of Planning and Budget's *State of Utah Economic & Demographic Projections 1994*, September 1994. Emissions were estimated to increase at the rate of employment growth within the Transportation, Communications and Public Utilities Segment of industry.

(B) Aircraft

The Wasatch Front Regional Council (WFRC) provided growth figures for aircraft emissions in Salt Lake and Davis Counties. These growth figures were applied to the daily emissions calculated in the 1994 attainment inventory to obtain emission projections through the year 2007.

(C) Other Non-Road Engines

Growth factors for estimating projection year emissions were based on a combination of employment and population growth derived from the Office of Planning and Budget's *State of Utah Economic & Demographic Projections 1994* and the incorporation of EPA's final rule for emission standards for new nonroad compression-ignition engines at or above 37 kilowatts (50 hp) (59 FR 31306). The final

rule was posted in the Federal Register on June 17, 1994, and the regulation became effective on July 18, 1994. The rule estimated NO_x emission reductions from the baseline at 0.46% in 1996, 9.1% in 2000, and 20.5% in 2005. The non-road emissions from point sources are not expected to grow significantly during the next ten years.

(d) Biogenic Emissions

Technical Support Document, Volume 17, tabs 8 through 11

Biogenic emissions will be constant from the 1994 estimate forward unless a significant change occurs in land use. The documentation for the PC-BEIS model defined the procedure for the selection of the modeling day. The modeled day was a typical ozone day, selected from the period 1988 through 1990. The typical ozone day is the fourth-highest temperature day out of the top ten ozone days from this three year period.

(2) Conformity

Section 176 (c) of the CAA states that "No department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity which does not **conform** to an implementation plan after it has been approved or promulgated under section 110." Section 176 (c)(2)(A) further states that no transportation improvement program may be adopted by a metropolitan planning organization "until a final determination has been made that emissions expected from implementation of such plans and programs are consistent with *estimates of emissions from motor vehicles - - - contained in the applicable implementation plan, - - -*." The purpose of this section of the Maintenance Plan is to provide emissions budget information to be used by the metropolitan planning organization or other entities seeking to demonstrate conformity as specified by section 176 of the CAA.

Emissions budgets are established in implementation plans and maintenance plans through the specific methods which the plan uses to demonstrate attainment and maintenance of the standard. In the case of maintenance plans, a September, 1992, EPA memorandum, "Procedures for Processing Request to Redesignate Areas to Attainment", drafted by Mr. John Calcagni prescribes the methods which can be used to demonstrate maintenance, and in so doing also prescribes by default the methods by which emissions budgets can be developed for use in demonstrating conformity.

The Calcagni memorandum directs that a state may "demonstrate maintenance of the NAAQS by either showing that future emissions will not exceed the level of an attainment inventory, or by modeling to show that the future mix of sources and emissions rates will not cause a violation of the NAAQS." The attainment inventory method has been used to demonstrate maintenance through the year 2007 (see Section IX.D.2.f(1) above), and emissions budgets for the respective source categories, including on-road mobile sources, for the years 1997 through 2007 have been taken from the Projection Inventories for those years and are presented in Table 8. Emission budgets for the period extending from 2008 to 2020 have been established by invoking the modeling option provided for in the Calcagni memorandum, and are also provided in Table 8, for conformity purposes only.

Currently, two models are approved by EPA: The Urban Airshed Model (UAM) and the Empirical Kinetic Modeling Approach (EKMA). Correspondence from EPA to the State in September, 1993, authorized the use of EKMA for establishing VOC control requirements. EPA expressed that, while considering time constraints, EKMA is the only viable option for developing VOC control, EKMA can not be used to obtain exemptions from NO_x RACT or NO_x NSR requirements. Notwithstanding these limitations, EPA instructed that "NO_x

reductions associated with NO_x RACT and NSR requirements, and other changes to the NO_x inventory such as mobile source emissions" could be used as input data for EKMA attainment demonstrations. The 1996 projected inventory was explicitly cited as an example of such application.

Based on these policies and precedent approvals, EKMA has been used to develop emissions budgets for years intervening between 2007 (the final year of the ten year maintenance demonstration based on the attainment inventory method) and the year 2020. The emissions budget for each source category, including on-road mobile sources, is given in Table 8. The Metropolitan Planning Organization may demonstrate conformity with each individual county budget (sub-area budget), or with the combined Salt Lake County/Davis County budget.

(3) Emissions Credit Allocation

The difference between each years' projected inventory and the 1994 attainment emissions level is called the "emissions credit" for that year. The emission credit, or a portion of the emissions credit, may be used for conformity determinations of transportation plans and transportation improvement programs conducted by the metropolitan planning organization and the federal Department of Transportation. The allocation of emissions credits shall be made by order of the Utah Air Quality Board and shall not be inconsistent with this plan. The emissions credit may not be allocated to point sources or other source categories unless the State has adopted and EPA has fully approved a generic emission trading rule or a source-specific SIP revision consistent with the requirements of Economic Incentive Program rules (40 CFR Part 51, Subpart U).

(4) Application of Urban Airshed Modeling (UAM) and Empirical Kinetic Modeling Approach (EKMA)

Technical Support Document, Volume 18, Tabs 18.0 through 18.38

In a September 1992 guidance memorandum, "Procedures for Processing Requests to Redesignate Areas to Attainment", Mr. John Calcagni prescribed the methods which can be used to demonstrate maintenance. A state may "demonstrate maintenance of the NAAQS by either showing that future emissions will not exceed the level of an attainment inventory, or by modeling to show that the future mix of sources and emission rates will not cause a violation of the NAAQS."

Currently, two models, UAM and EKMA are recommended by EPA. The UAM is a technically sophisticated three-dimensional photochemical grid model designed to calculate the concentrations of both inert and chemically reactive pollutants by simulating the physical and chemical processes in the atmosphere. The EKMA model is also a photochemical model which models the trajectory of a column of air containing ozone and or its precursors, but lacks the technical complexity and strength found in UAM. The EKMA model is relatively simple and inexpensive to use, but its lack of technical rigor begs for limited application in maintenance demonstrations.

The use of models in demonstrating maintenance in this Maintenance Plan is a function of two factors: 1) The State does not currently have a UAM calibrated for the Salt Lake/Davis County area, and 2) The State has EKMA capability but has limited confidence in the EKMA's ability to model the complex atmospheric parameters of the Salt Lake/Davis County air basin. Its use is, therefore, restricted to the future years beyond the initial ten-year maintenance demonstration period; i.e., the State has used the attainment emissions

inventory approach to demonstrate maintenance for ten years beyond the expected date of redesignation (1997 - 2007) and has reserved the use of EKMA to the period of 2007 - 2020.

The State has undertaken the development of UAM as a possible alternative to either or both the emission inventory approach or EKMA. It is the intent of the State to base future planning on the best technical information possible, and UAM is currently the state-of-the-art modeling approach. The state has received legislative appropriations to finance the development of the UAM and has a schedule for having UAM capability by 1997. The details of those facts and a review of UAM is provided in Appendix 1 of Section IX.D of the SIP.

Figure 3. Salt Lake and Davis County VOC Projections tons/day

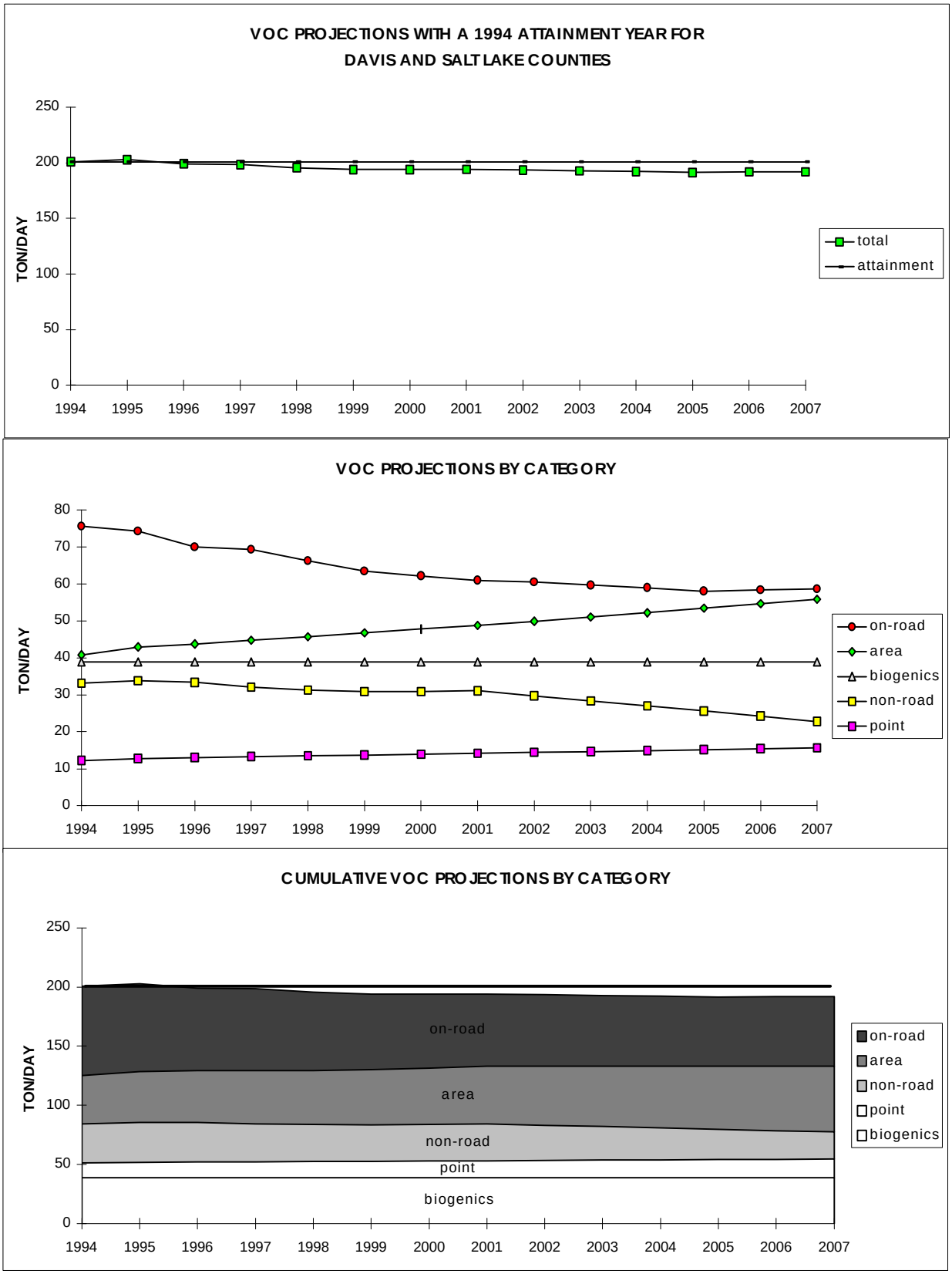


Figure 4. Salt Lake and Davis County CO Projections Tons/Day

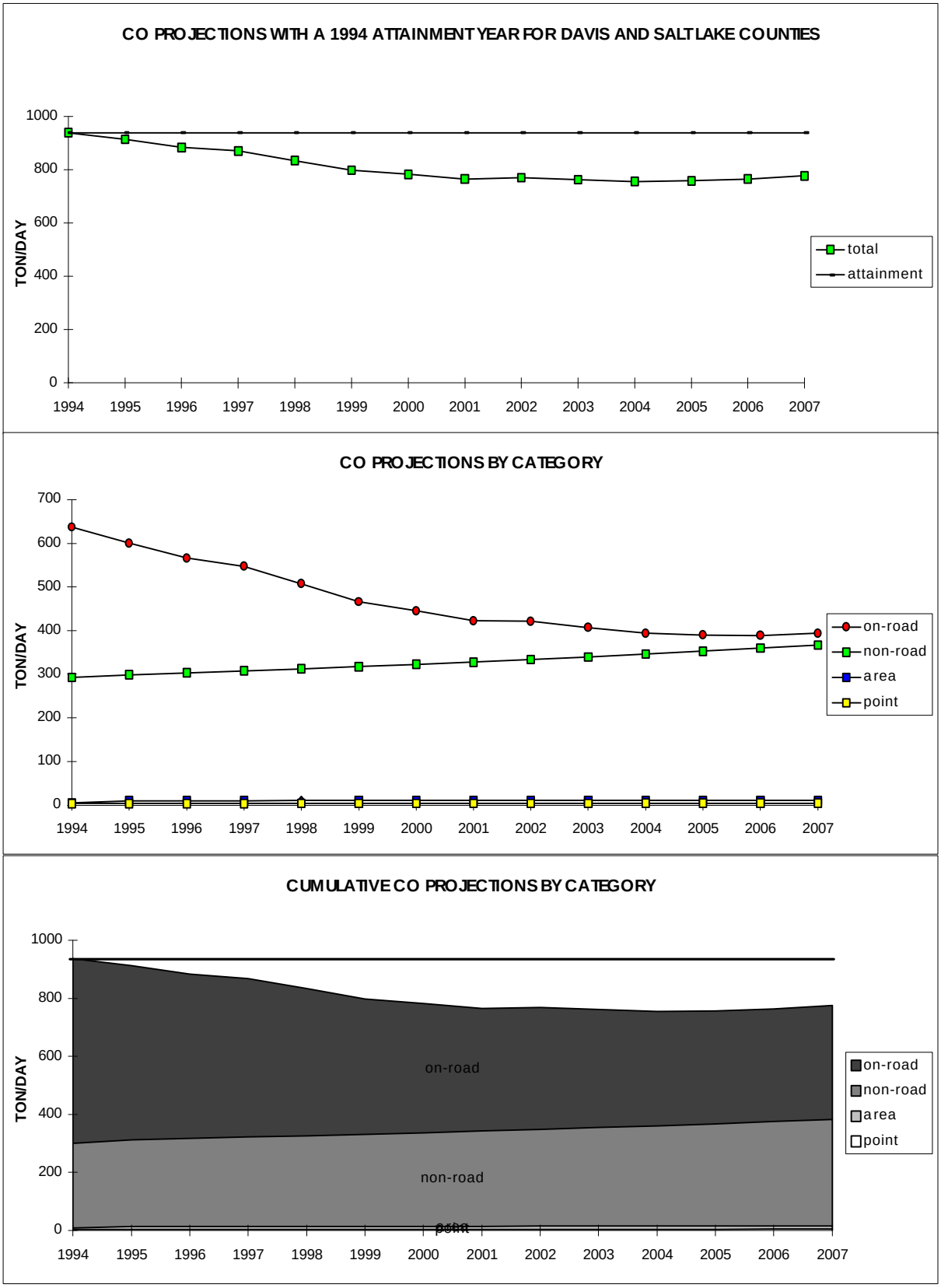


Figure 5. Salt Lake and Davis County NO_x Projections Tons/Day

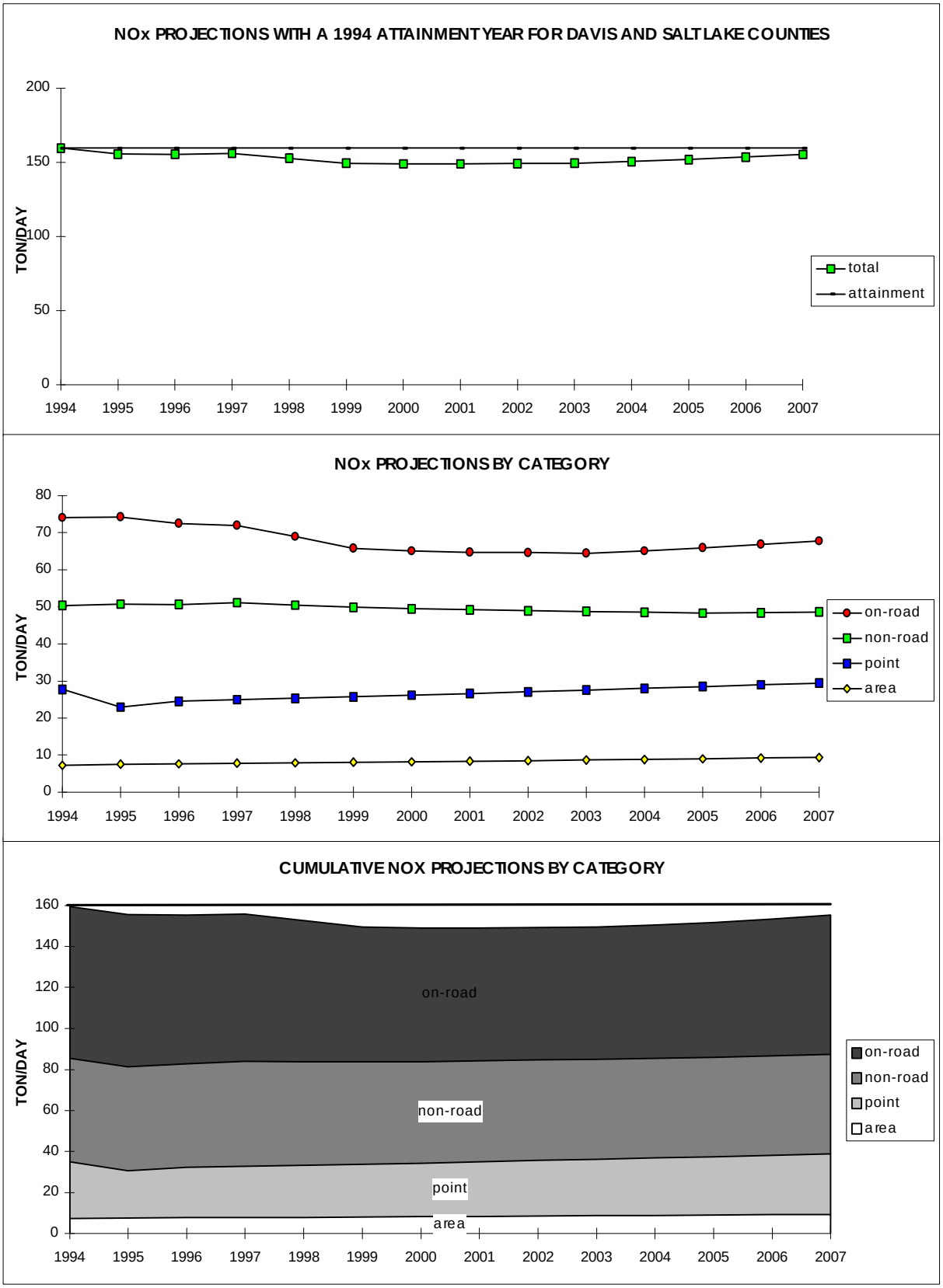


Table 8. Emissions Budget in Tons/Peak Ozone Day - For Conformity Purposes

Salt Lake County

	Area Sources			On-Road Mobile Sources			Non-Road Mobile Sources			Point Sources		
Year	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
1994	32.51	3.45	5.76	61.16	514.32	58.35	26.43	231.20	40.55	5.05	1.93	22.17
1995	33.66	4.27	5.90	60.02	485.01	58.50	26.90	235.40	40.44	5.33	1.88	17.22
1996	34.32	4.33	6.00	56.74	458.48	57.23	26.47	238.29	40.13	5.38	1.90	18.61
1997	35.12	4.39	6.10	56.31	444.41	56.94	25.51	241.88	40.41	5.44	1.93	18.92
1998	35.92	4.44	6.18	53.99	413.13	54.54	24.80	244.94	39.71	5.48	1.95	19.14
1999	36.79	4.50	6.28	51.57	377.27	51.51	24.51	248.65	39.13	5.53	1.97	19.40
2000	37.69	4.57	6.39	50.88	363.72	51.46	24.53	252.77	38.74	5.59	1.99	19.70
2001	38.52	4.64	6.50	49.92	345.70	51.22	24.70	256.80	38.47	5.65	2.01	20.02
2002	39.41	4.71	6.61	49.68	345.50	51.23	23.60	261.16	38.20	5.71	2.04	20.35
2003	40.37	4.78	6.73	48.97	334.67	51.18	22.53	265.89	37.93	5.78	2.06	20.67
2004	41.36	4.86	6.86	48.53	324.10	51.80	21.49	270.86	37.71	5.84	2.09	21.00
2005	42.38	4.94	6.99	47.72	320.61	52.51	20.43	275.96	37.50	5.90	2.11	21.32
2006	43.36	5.02	7.12	48.09	320.35	53.29	19.34	281.27	37.53	5.97	2.14	21.70
2007	44.36	5.10	7.26	48.25	324.51	54.03	18.22	286.63	37.64	6.04	2.17	22.07
2015	53.42	5.86	8.46	53.71	366.13	62.11	17.92	335.81	40.32	6.61	2.38	23.31
2020	59.26	6.32	9.19	59.15	408.63	69.19	19.63	366.43	43.39	6.96	2.45	23.39

Davis County

	Area Sources			On-Road Mobile Sources			Non-Road Mobile Sources			Point Sources		
Year	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
1994	8.30	1.42	1.47	14.50	122.72	15.76	6.73	61.49	9.84	7.20	1.75	5.55
1995	9.30	5.71	1.63	14.23	115.44	15.77	6.92	63.54	10.26	7.44	1.81	5.74
1996	9.45	5.73	1.68	13.28	107.66	15.30	6.86	64.96	10.51	7.65	1.87	5.90
1997	9.61	5.75	1.71	13.04	102.87	15.03	6.61	66.17	10.71	7.83	1.91	6.04
1998	9.78	5.76	1.74	12.30	94.57	14.47	6.44	67.34	10.73	7.99	1.96	6.17
1999	9.96	5.78	1.78	11.95	88.86	14.29	6.37	68.63	10.74	8.17	2.00	6.31
2000	10.14	5.80	1.82	11.31	81.47	13.65	6.37	69.89	10.73	8.34	2.05	6.44
2001	10.30	5.82	1.85	11.04	76.52	13.50	6.42	71.14	10.75	8.53	2.09	6.59
2002	10.48	5.84	1.89	10.88	75.75	13.39	6.11	72.47	10.77	8.72	2.14	6.73
2003	10.67	5.86	1.93	10.68	72.51	13.28	5.81	73.90	10.79	8.90	2.19	6.88
2004	10.88	5.88	1.97	10.46	69.99	13.33	5.52	75.39	10.81	9.09	2.24	7.02
2005	11.09	5.90	2.01	10.34	69.01	13.44	5.22	76.92	10.83	9.28	2.29	7.17
2006	11.29	5.92	2.05	10.34	68.77	13.56	4.90	78.49	10.91	9.45	2.33	7.29
2007	11.49	5.94	2.10	10.44	69.58	13.72	4.58	80.07	11.00	9.59	2.36	7.38
2015	13.41	6.13	2.46	11.35	78.03	15.41	4.39	94.25	12.12	10.71	2.61	8.11
2020	14.53	6.25	2.68	12.00	83.72	16.44	4.78	102.96	13.13	11.41	2.76	8.56

Table 8. (cont.) Emissions Budget in Tons/Peak Ozone Day - For Conformity Purposes

Combined Davis and Salt Lake County

	Area Sources			On-Road Mobile Sources			Non-Road Mobile Sources			Point Sources		
Year	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
1994	40.81	4.87	7.22	75.66	637.04	74.11	33.16	292.68	50.39	12.25	3.68	27.72
1995	42.96	9.98	7.54	74.25	600.45	74.27	33.82	298.94	50.70	12.77	3.70	22.96
1996	43.77	10.06	7.67	70.02	566.14	72.53	33.33	303.25	50.63	13.03	3.77	24.52
1997	44.74	10.13	7.81	69.35	547.28	71.97	32.12	308.06	51.12	13.27	3.84	24.96
1998	45.70	10.21	7.93	66.29	507.70	69.01	31.23	312.28	50.44	13.48	3.90	25.31
1999	46.75	10.29	8.06	63.52	466.13	65.80	30.88	317.27	49.87	13.70	3.97	25.71
2000	47.82	10.37	8.21	62.19	445.19	65.11	30.91	322.66	49.47	13.93	4.03	26.14
2001	48.82	10.45	8.35	60.96	422.22	64.72	31.12	327.94	49.22	14.18	4.11	26.61
2002	49.88	10.54	8.50	60.56	421.25	64.62	29.71	333.62	48.97	14.43	4.18	27.08
2003	51.04	10.64	8.66	59.65	407.18	64.46	28.35	339.79	48.72	14.68	4.25	27.55
2004	52.23	10.74	8.83	58.99	394.09	65.13	27.00	346.26	48.52	14.93	4.33	28.02
2005	53.46	10.84	9.00	58.06	389.62	65.95	25.64	352.88	48.33	15.18	4.40	28.49
2006	54.65	10.94	9.18	58.43	389.12	66.85	24.25	359.76	48.44	15.42	4.47	28.99
2007	55.85	11.05	9.36	58.69	394.09	67.75	22.81	366.70	48.64	15.63	4.53	29.45
2015	66.83	12.00	10.92	65.06	444.16	77.52	22.31	430.06	52.44	17.33	4.99	31.42
2020	73.79	12.57	11.88	71.15	492.35	85.63	24.41	469.39	56.52	18.38	5.21	31.94

IX.D.2.g. NEW REGULATIONS AND CONTROLS

Requirement Relating to New Emission Controls:

> - *The state must ensure that it has legal authority to implement and enforce all control measures for which emissions credits are assumed in the projection inventory demonstrating maintenance of attainment. (Calcagni, "Procedures for Processing Requests to Redesignation Areas to Attainment." pp 11, September 2, 1992.)*

Section IX.D.2.b of this plan identifies emission controls that are currently in effect and that have contributed to the air quality improvements in the 1994 inventory. The State of Utah is implementing the following emission control programs to counteract the effects of growth or other emission changes between 1994 and 2007. The effects of these programs are already reflected in the projection emission inventory in Section IX.D.2.f(1).

(1) Improved I/M or Equivalent NO_x and VOC Control

Technical Support Document, Volume 19, Tabs 19.0 through 19.2

The emissions inventory demonstrates that the major generator of ozone precursors in the Wasatch Front is the motor vehicle fleet. Salt Lake City is also currently designated as nonattainment for CO and Salt Lake County is currently designated as nonattainment for PM_{10}, and emissions from the southern portion of Davis County impact those nonattainment areas. Improvements to the existing basic I/M programs in Salt Lake and Davis Counties will cause significant reductions in NO_x (a PM_{10} and ozone precursor) and VOC, thereby helping improve the air quality year-round along the Wasatch Front. Figures 6, 7, and 8 visually document the emission reductions that will be achieved through improvements to the I/M program or equivalent controls.

The Utah Legislature assigned authority and responsibility for the design, implementation, and operation of Utah's vehicle emissions inspection and maintenance programs to county governments. Section 41-6-163.6 of the Utah Code, as amended in 1994, provides the statutory authority for Salt Lake and Davis Counties to implement an I/M program that is more stringent than the minimum federal basic I/M standard if the improvements are needed to meet the requirements of this state implementation plan

(a) Performance Standard.

In September, 1996, Salt Lake and Davis Counties both finalized the details of improvements that they will make to their I/M programs. The composite emission factors developed in the projection inventory and specific to each county are set as a minimum *performance standard* target for them to meet (Tables 9 and 10). The details surrounding the actual I/M programs may be adjusted by the county health departments as long as the program meets or exceeds these emissions reduction goals.

Table 9. Salt Lake County - I/M Program Performance Standard

	Emission Factors in grams/mile			
Pollutant	**1998**	**2000**	**2003**	**2006**
VOC	2.09	1.85	1.63	1.47
CO	15.46	12.65	10.56	9.29
NO_x	2.20	1.96	1.81	1.76
Evaluation Speed	*34.1*	*34.2*	*34.3*	*34.4*

Table 10. Davis County - I/M Program Performance Standard

	Emission Factors in grams/mile			
Pollutant	**1998**	**2000**	**2003**	**2006**
VOC	1.95	1.77	1.55	1.41
CO	14.48	11.79	9.74	8.56
NO_x	2.25	2.09	1.94	1.90
Evaluation Speed	*37.5*	*37.5*	*37.6*	*37.7*

The performance standard for each county is different for two reasons. First, the average vehicle speed in Davis County is higher than in Salt Lake County, which leads to a different performance standard, even if both counties were held to the same modeling input parameters. Second, the standard is based on the actual programs that the counties are planning to implement. Because the two counties are planning to implement significantly different kinds of I/M programs, the performance standard is also different.

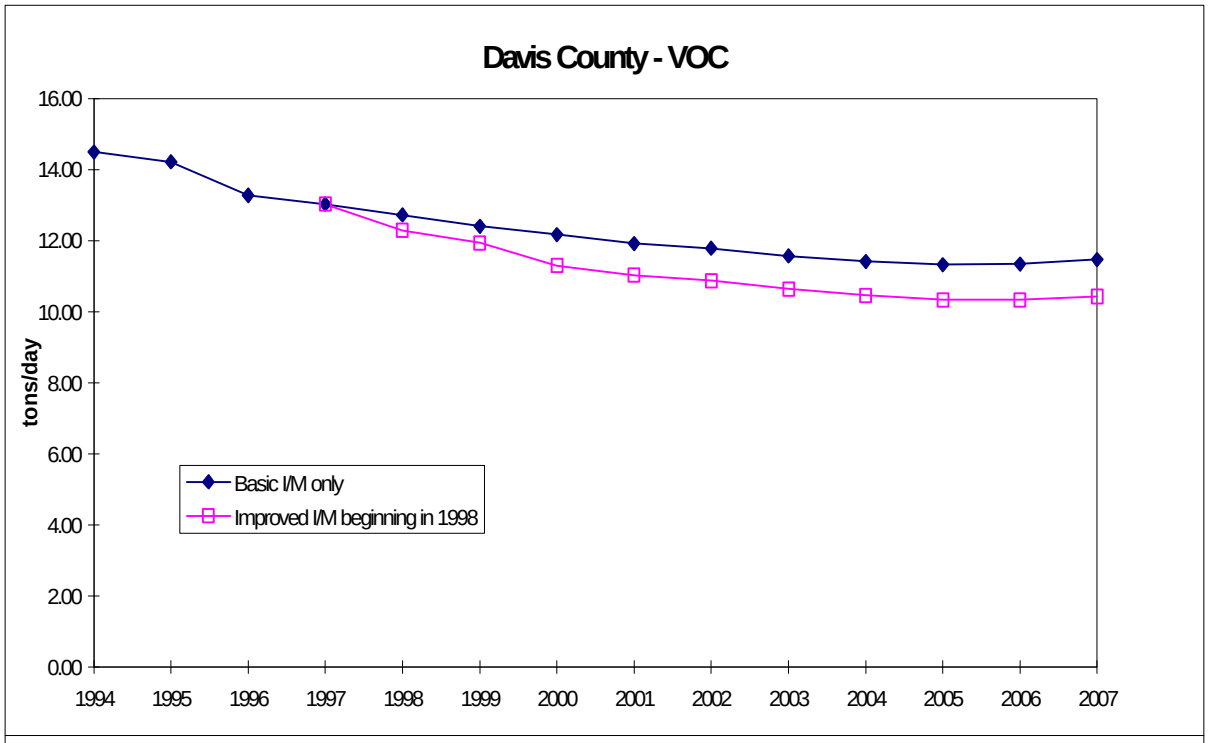
(b) Implementation Schedule

Salt Lake and Davis Counties have committed to implement I/M program improvements no later than January 1, 1998, sufficient to achieve the emissions reductions specified in this plan.

(2) Federal Nonroad Diesel Control Program

Section 213 of the Act requires EPA to promulgate regulations that result in reductions in emissions from nonroad diesel engines greater than 50 horsepower. These regulations were promulgated by the EPA on June 17, 1994, as 40 CFR Part 89. The rule estimated NO_x emission reductions from the baseline at 0.46% in 1996, 9.1% in 2000, and 20.5% in 2005. The State is not responsible for the implementation or enforcement of this proposed regulation, but will realize significant NO_x reductions from its implementation.

Figure 6. On-Road Mobile Projections Showing Improved I/M VOC Reductions



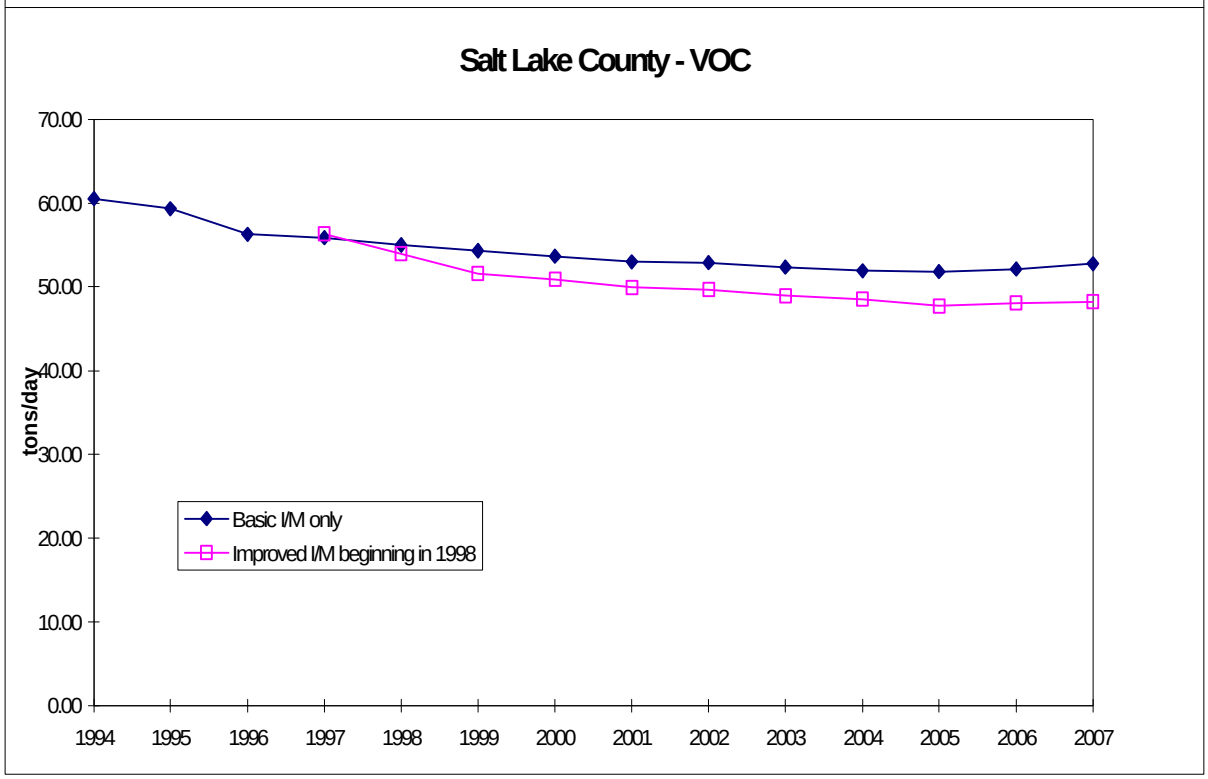


Figure 7. On-Road Mobile Projections Showing Improved I/M CO Reductions

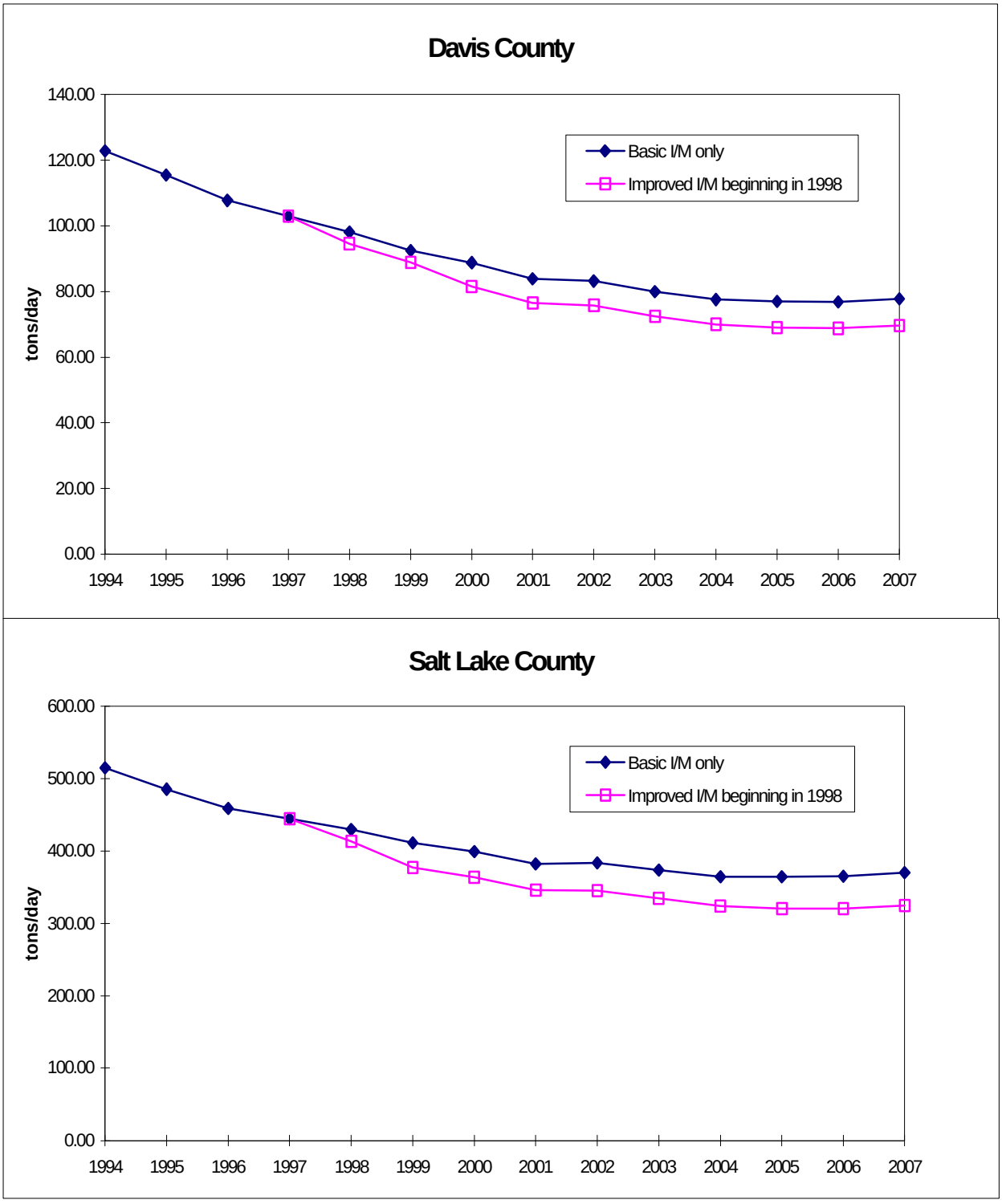
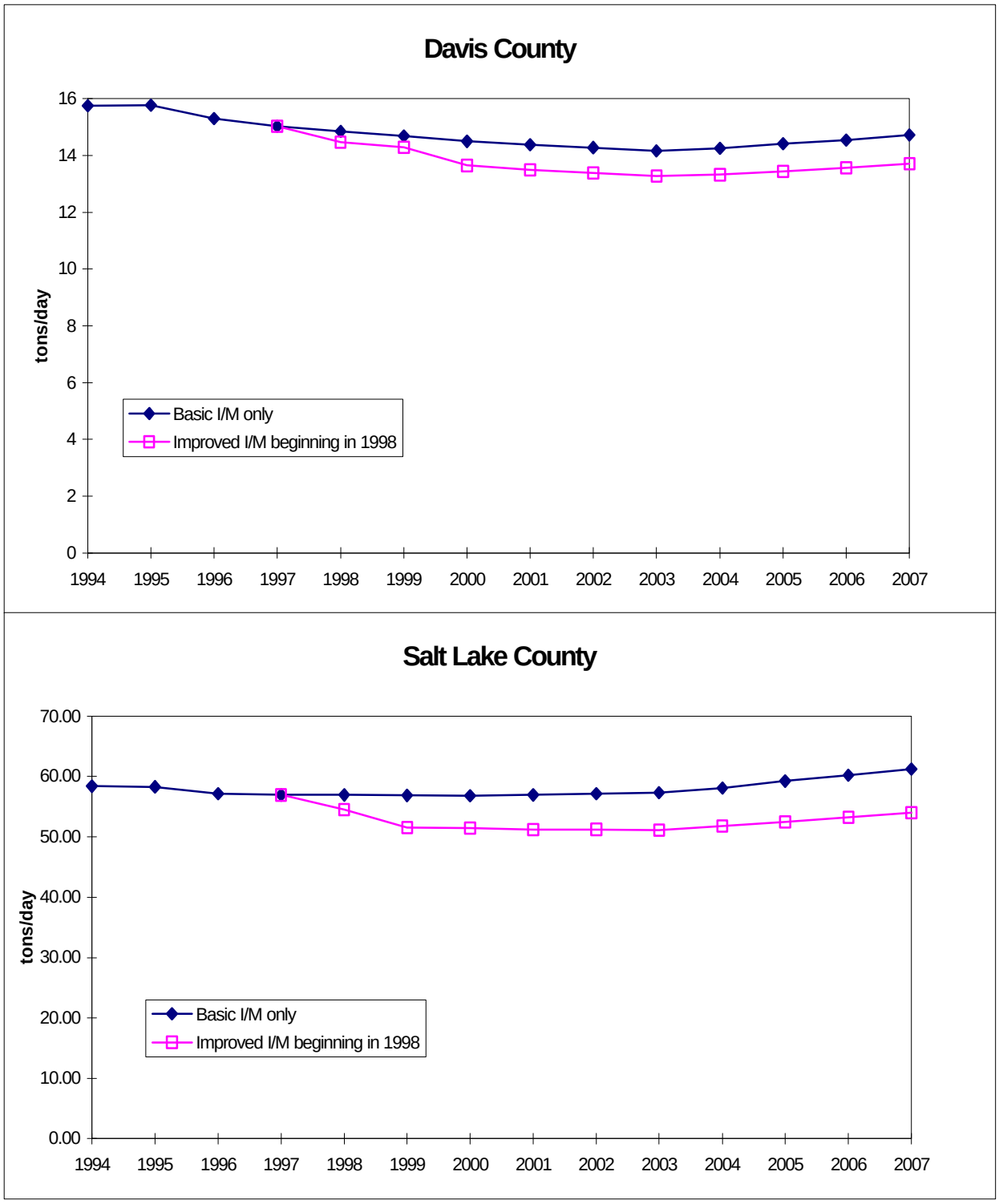


Figure 8. On-Road Mobile Projections Showing Improved I/M NO_x Reductions



IX.D.2.h. CONTINGENCY MEASURES

Requirement Relating to Contingency Measures:

- *Section 175A of the Act requires that areas seeking redesignation from nonattainment to attainment develop contingency measures that include state commitments to implement additional control measures in response to future violations of the NAAQS.*

(1) Purpose of Contingency Planning

Section 175A of the Act requires that maintenance plans include VOC and NO_x control measures necessary to assure prompt action to correct any violation of the standard which occurs after the area is redesignated to attainment. The maintenance plan is to include a state commitment to implement additional VOC and/or NO_x control measures which were contained in the SIP for the area before redesignation to attainment. For attainment areas, additional controls are to be implemented in response to ozone violations, and/or increases in VOC or NO_x emissions that threaten the standard after an area is redesignated to attainment. The purpose of these controls in attainment areas is to achieve sufficient VOC and/or NO_x emission reductions to eliminate further ozone violations. Implementing controls in response to ozone violations in attainment areas can occur without federal redesignation of the area to nonattainment. It should also be noted that the pollutant of concern is ozone, for which VOCs and oxides of nitrogen are precursors.

The State collected information based on discussions and information from industry, metropolitan planning organizations, EPA and other states regarding the magnitude of VOC and NO_x emission reductions from various control strategies. The effectiveness and viability of possible control measures were compared. Some controls interact with other controls thereby decreasing the overall effectiveness. Estimates of the emission reductions expected from implementation of mobile source measures have been obtained from MOBILE5A estimates where applicable. The major considerations that went into choosing the following control strategies were:

- cost effectiveness;
- easily realized reductions with minimal lead in time, and;
- overall benefit of controls.

(2) Determination of Contingency Action Level

To ensure that the ozone standard is maintained in the future, the State has established a contingency action level that is based on ambient ozone measurements.

(a) Contingency Trigger Date

By November 1st of each year, the Executive Secretary will review the ozone ambient monitoring data that have been collected during that year's ozone season (May through September) together with data from the ozone seasons of the previous two years. The monitoring data from those three years will be used to calculate an "expected exceedance" for each monitor in the Salt Lake/Davis County air basin as per 40 CFR Part 50 Appendix H. If the calculated expected exceedance for any monitor in the said air basin is

greater than 1.0, the Executive Secretary will notify the Air Quality Board and EPA that contingency measures have been triggered. The date of this notification will be considered the contingency trigger date.

(b) Actions Taken if the Action Level is Exceeded

If the ambient monitoring action level is exceeded the Executive Secretary will take the following actions:

(i) Implement the Contingency Measures that are included in Section IX.D.2.h(3).

(ii) Prepare a report that outlines the recorded ambient measurements, the expected exceedances of the ozone standard, and the actions that have been taken to implement contingency measures, including a schedule of future events. This report will be submitted to the Air Quality Board and the EPA.

(3) Contingency Measures

(a) Offset Ratio for VOC and NO_x

R307-1-3.3.3.C contains more stringent offset requirements for VOC and NO_x that would be triggered as a contingency measure. The offset requirements will become effective the day after the contingency trigger date. The emission threshold for applicability to VOC and NO_x offset requirements is lowered from 100 tons to 50 tons. In addition, the offset ratio is increased from 1.15:1 to 1.2:1 to require increased reductions of VOC and NO_x in Salt Lake and Davis Counties. The more stringent emission threshold and offset ratio were both selected on the basis that these are the parameters that apply to "serious" nonattainment areas; "serious" being the next category up the level of hierarchy specified by the Clean Air Act, Section 182. The Salt Lake/Davis County nonattainment area for ozone is presently classified as a "moderate" area.

Specific costs for implementation of this contingency measure must be determined on a case-by-case basis and could not be easily estimated, but it is assumed that any costs incurred by industry will be passed on to the consumer.

(b) Stage II Vapor Recovery

Technical Support Document, Volume 19, Tab 19.3

The Air Quality Board has adopted R307-14-10, "Stage II Vapor Recovery Systems," which would require installation of Stage II vapor recovery systems in Davis and Salt Lake Counties if Stage II is triggered as a contingency measure. The schedule for implementation of Stage II after the contingency has been triggered is contained in R307-14-10. The following condition applies to this contingency measure:

Pressure Test Exemption. If, for each county in the nonattainment area, the authorized body required under federal law to utilize an I/M program has established a gas cap pressure test program, the State may delay implementation of Stage II as a contingency measure. To qualify for this exemption:

1) The gas cap pressure test program must have been legally adopted and implemented before the contingency trigger date.

2) The gas cap pressure test program must have been in place for less than a year.

If the counties in the nonattainment area qualify for this exemption, the gas cap pressure test program may be substituted for Stage II Vapor Recovery as the required contingency measure. If the action level identified in Section IX.D.2.h(2) is exceeded after the gas cap pressure test program has been in place for a year, Stage II must also be implemented as a contingency measure.

Stage II vapor recovery was chosen as a contingency measure for the following reasons:

1) VOC emission reductions can be achieved expeditiously. After the rules are implemented, the high volume stations will be required to install controls before the next ozone season. The remaining affected stations would be phased in over the following two years.

2) Significant VOC emissions reductions due to implementation of Stage II have been estimated from MOBILE5A runs. The documentation is contained in the Technical Support Document.

3) EPA has documented that Stage II is a cost-effective strategy for controlling VOC emissions.

4) There is an extra health benefit from implementing Stage II controls, in that it will also significantly reduce exposure to benzene, a component of gasoline and a known human carcinogen.

(c) More Stringent Low-NO_x Burner Controls

R307-1-3.1.12.B contains more comprehensive low NO_x burner requirements which would be implemented as contingency measures. The existing rule, which requires all new or replacement burners to meet low NO_x burner emission levels, would be expanded to include all existing sources in Salt Lake and Davis Counties. Within 2 months of the contingency trigger date, existing sources that have not installed low NO_x burners would be required to submit a schedule either for replacement of their burners, or for controls resulting from application of an equivalent technology. A source may request an exemption if replacement of the existing burner is not physically practical or cost effective. The required equipment shall be operational as soon as practicable or within a reasonable time frame agreed upon between the source and the Executive Secretary.

IX.D.2.i. OTHER CONTROL MEASURES

Technical Support Document, Volume 19, Tab 19.5

(1) Employer-based Trip Reduction (ETR) Programs

The goal of the Employer-Based Trip Reduction (ETR) Program is to introduce and implement strategies designed to reduce the amount of measurable miles driven by employees commuting to and from work. The desired result would be a heightened awareness of the direct relationship between driving and air pollution, and a reduction in the amount of vehicle-related pollution in Salt Lake and Davis Counties.

Rule R307-11, the Employer-based Trip Reduction Program is applicable for federal, state, and local government agencies with 100 or more employees at a work site. The rule may be extended to include all employers with 100 or more employees at a work site if it is determined necessary to maintain the national ambient air quality standard for ozone. The Trip Reduction Program which includes government agencies in Salt Lake and Davis Counties was implemented in 1995. For the first year of the program, 13 of 26 government agencies submitting trip reduction plans exceeded the first-year target.

Wasatch Front Regional Council prepared estimates of emission reductions that could be obtained by the years 2005 and 2015 if Trip Reduction Programs were implemented. See Table 11.

The State recognizes that emission reductions will be achieved through the Trip Reduction Program, but these reductions have not been included in the projected emission inventory, and credit for these reductions has not been included in this maintenance plan.

The Trip Reduction Program will require a 20% decrease in the drive alone rate. Strategies include:

a. Mass Transit
   (1) Subsidized Bus Passes
   (2) Worker Service/Express Bus
   (3) Regular Bus Service

b. Vanpool/Carpool Programs
   (1) No-Interest Vanpool Program
   (2) Vanpool Leasing Program
   (3) State Motor Pool Vanpool (for state employees)
   (4) Ridesharing
   (5) Match Lists

c. Telecommuting
d. Compressed Work Week/Flexible Work Schedule
e. Work Site Parking Fees/Preferential Parking
f. Transportation for Business-Related Activities
g. On-Site Facility Improvements
h. Bicycling/Walking

Table 11. Emissions Reductions from a 20% Reduction in the Drive-Alone Rate

	Work Trips Eliminated	Trip Length (miles)	Vehicle Miles Eliminated	Summer NO_x Eliminated (tons/wkday)	Summer VOC Eliminated (tons/wkday)
Salt Lake County					
2005	74,000	9.5	703,000	1.34	1.33
2015	146,000	9.5	1,387,000	2.63	2.62
South Davis County					
2005	6,500	9.5	61,750	0.11	0.09
2015	8,000	9.5	76,000	0.14	0.11

IX.D.2.j MEASURES TO VERIFY CONTINUED OZONE MAINTENANCE

Requirement Relating to Verification of Continued Maintenance:

- *The maintenance plan must indicate how the state will track the progress and the Maintenance Plan.*

(1) Tracking System for Verification of Emission Inventory

Continued maintenance of the ozone standard in Salt Lake and Davis Counties depends in large measure upon the ability of the state to track VOC and NO_x emissions in future years. Consequently, the State will perform the following to verify maintenance:

(a) As required by the Act, the State will submit NO_x, VOC, and CO emission inventories to EPA for Salt Lake and Davis Counties every three years, beginning with the inventory for 1996. As required by the Act, the 1996 inventory will be submitted to EPA by November 15, 1998, and later inventories will be submitted on a three-year schedule from this date. These inventories will follow the same procedures used to develop the 1994 attainment emission inventory, by applying the Inventory Preparation Plan and Quality Assurance Checklist. The emission inventories will be based on the most current VMT data, actual point source emissions, and area source emissions founded on the most current population and industry growth information. This submittal will also include summary tables and graphs of VOC, NO_x, and CO comparing projected emissions with actual emissions.

(b) The State will develop an annual emissions inventory for point sources in the nonattainment area, as established in R307-1-3.5.1 Criteria Pollutant Inventory, and R307-1-3.5.3 Emission Statement Inventory.

(c) Projects will be coordinated between the Small Business Assistance Program, the Toxics Program, and the Planning Branch to obtain more accurate information on area sources, and to update the emission inventories to reflect the most recent emissions obtained from these sources. An example of this would be results obtained from auto body painting workshops and inventories.

(d) The State will coordinate the efforts of the Operating Permit Program with the Planning Branch. Inspectors and emission inventory personnel will monitor sources to verify all major point source emissions, as well as a percentage of area source emissions reported in the emission inventory and/or their operating permits.

(e) Projects will be coordinated between the Engineering Branch and the Planning Branch. By using the comprehensive engineering tracking system, the Planning Branch will be informed of all NOI's that have been submitted, new sources that receive approval orders, and sources that fall below the de minimis limit for approval orders. This tracking system will reveal estimated emissions, modifications, etc. that should be tracked and reflected in the emission inventory for Salt Lake and Davis Counties.

(2) Annual Review of the Ozone Monitoring Network

The State will continue to evaluate the ambient ozone monitoring network to ensure that the network meets all applicable federal regulations and guidelines. The results of this evaluation will be submitted to EPA by October 1st of each year in the annual Network Review.

(3) Provisions for Revising the Maintenance Plan

The State will revise the Plan as necessary in response to revisions of the national primary ambient ozone standard, or to take advantage of improved or more expeditious methods of maintaining the standard. The State will also revise the Plan as necessary to comply with any future EPA finding that the Plan is inadequate to attain or maintain the national ambient ozone standard, or every eight years in compliance with Section 175A of the Act.

(4) Provision for Prohibiting Emissions That Interfere With Attainment In Other States

The State will take steps as necessary to prohibit emissions within the state that have been shown to interfere with attainment or maintenance of a NAAQS in another state.

APPENDIX 1: URBAN AIRSHED MODEL

(1) Photochemical Modeling Verses the Attainment Inventory Approach to Demonstrating Maintenance of the Standard

This redesignation request demonstrates maintenance of the ozone standard using the emissions inventory approach as outlined in the Calcagni memorandum, dated September 1992. This approach is based on the assumption that if the future year emissions of ozone precursors are at or below the levels of the attainment year then the future year will also be in attainment. While EPA accepts this approach as an easy means of demonstrating maintenance, the approach ignores many of the factors that affect ozone formation. This is especially true for the Wasatch Front, with its complex terrain and meteorology.

The emissions inventory approach is basically a model of ozone formation that states that ozone is strictly a linear function of a county-wide inventory of its precursors; NO_x, VOC, and CO. The more of the precursors that are emitted into the atmosphere, the more ozone will be formed (higher concentration). The emission inventory approach was used to show maintenance of the standard in this plan because it was the best tool the State had available, within the short time frames allowed under the Clean Air Act, to show attainment of the standard. In addition, the method met the criteria established by EPA for redesignating an area to attainment.

In reality, ozone is also a function of other parameters including: the meteorology, the solar intensity, the spatial distribution of the precursor emissions, the time of day the precursors are emitted, the concentration of the emissions relative to one another, and the reactivity of the particular VOC species. The photochemical process by which ozone is formed is very complex, involving literally hundreds of possible reactions that are dictated by the availability of the reactants. In some "urban mixes," reducing a precursor will reduce ozone concentrations while in others the same reduction may actually cause an increase.

Because of ozone's complex formation process, it becomes important to include as many of the affecting parameters as possible into the model used to forecast future concentrations, whether it be for demonstrating maintenance or for triggering contingency measures at some point in the future. Currently, two models, Urban Airshed Model (UAM) and Empirical Kinetic Modeling Approach (EKMA), are recommended by EPA for photochemical ozone modeling.

In the EKMA model, a column of air containing ozone and precursors is transported along an assumed straight line trajectory. The trajectory is defined so that the simulated column of air being modeled is positioned over the center of the city at 8 a.m. and arrives at the site observing the daily maximum ozone concentration at the time of the observed maximum. The model is relatively simple and inexpensive to use.

Salt Lake and Davis Counties are located in a complex valley terrain area and near the Great Salt Lake. The mountainous terrain and the lake effects result in complex and non-uniform wind patterns in both the horizontal and vertical directions. Different sites within the area have different wind directions and speeds. Therefore, the straight line trajectory and a single plume column representative of the whole area, as assumed by EKMA, may not provide the best estimates of ozone concentration. However, as with the emission inventory approach, EKMA was used to show maintenance of the ozone standard to the year

2020 for conformity purposes because it was the best tool the State had available to use within the short time frame required by the Clean Air Act.

(2) Use of UAM to Validate the Maintenance Demonstration

The State has chosen to use UAM to conduct a more scientific investigation in order to characterize the process by which ozone is formed along the Wasatch Front during high episodes and to identify strategies for its control. The purpose of the UAM study will be to validate to a higher degree the ozone control and contingency strategies that were selected based on the emission inventory approach and EKMA modeling.

UAM is a gridded model that can handle a complex wind field, but is very data and resource intensive and expensive to run. In addition, because UAM is a grid model it can provide information on source apportionment of the ozone precursors. This source apportionment information is critical to determining source specific emission controls and avoiding over regulation.

(3) Application of the UAM to Simulate O3 Concentrations

The UAM is a three-dimensional photochemical grid model designed to calculate the concentrations of both inert and chemically reactive pollutants by simulating the physical and chemical processes in the atmosphere that affect pollutant concentration.

The major factors that affect photochemical air quality include:

The spacial and temporal distribution of NO_x and VOC,

The composition of the emitted VOC and NO_x,

The dynamics of the boundary layer, including stability and the level of mixing,

The chemical reactions involving VOC, NO_x, and other important species,

The diurnal variations of solar radiation and temperature,

The loss of ozone and ozone precursors by dry deposition, and

The ambient background of VOC, NO_x, and other species in, immediately upwind, and above the study region.

Because the UAM accounts for spacial and temporal variations as well as differences in the reactivity (speciation) of emissions, it is well suited for evaluating the effects of emission control scenarios on urban air quality. This is accomplished by first replicating a historical ozone episode to establish a base case simulation. Model inputs are prepared from observed meteorological, emission, and air quality data for particular episode days. The model is then applied with these inputs and the results are evaluated to determine its performance. Once the model results have been evaluated and determined to perform within prescribed levels, the same meteorological inputs and a projected emissions inventory are used to simulate possible future scenario concentrations. That is, the model will calculate hourly ozone patterns likely to occur under the same meteorological conditions as the base case.

(4) Input Data Requirements

The UAM simulates the emissions, advection and dispersion of precursors and the formation and deposition of ozone within every grid cell of the modeling domain (i.e., for the entire urban area). The successful and technically defensible simulation of ozone formation and transport can only be accomplished with an enhanced meteorological data base.

The use of UAM to adequately replicate the full-three-dimensional structure of the atmosphere during an ozone episode requires a day-specific data base for input preparation. For UAM applications, the observed air quality data are used to estimate the initial condition field for ozone, NO_x, and VOCs. These data are also used to simulate a two- to three-day episode, and the simulation is started sometime during the early morning hours of the first day. This procedure is followed so that the peak model calculations are not driven by the prescribed initial conditions. Nitrogen dioxides are important precursors to ozone formation, and the levels of NO and NO_2 calculated by the UAM can be evaluated with NO_x data from continuous samplers. It is desirable to have data from a number of NO_x sampler sites scattered throughout the modeling domain. Concentrations of reactive hydrocarbons are not required to run the model; however, in recent years measurements of reactive hydrocarbons have become more and more desirable to check the modeled concentrations and the calculated hydrocarbon to NO_x ratios at various locations within the modeling domain.

The UAM requires hourly estimates for the height of the mixed layer. Because ozone concentrations calculated by UAM are sensitive to mixing heights, day-specific upper-air temperature and wind data are required at various times throughout the day to adequately estimate the evolution of the nighttime and daytime mixed layers. Other meteorological data required by the UAM include ambient temperature, water concentration (derived from relative humidity measurements), atmospheric pressure, solar radiation, and cloud cover. In addition, the UAM requires a fully three-dimensional wind field for each hour. Upper-level wind data are used to estimate the flow field throughout and above the urban boundary layer and surface measurements throughout the domain provide data for the surface wind fields.

The UAM also requires hourly gridded emissions for NO_x and VOC. For VOCs the UAM can simulate the fate of emissions from anthropogenic and biogenic emission sources. In addition, the VOC emissions must be speciated or classified into their respective carbon-bond class because UAM employs the Carbon-Bond chemical kinetics mechanism.

(5) Level of Effort for the Salt Lake/Davis Application

The UAM project may be divided into the following work areas:

1. Work plan and protocol
2. Computer hardware and software
3. Development of meteorological and air quality data bases
4. Development of UAM emission (stationary) data bases
5. Mobile emission data bases (UDOT transportation model; MOBILE5A)
6. Meteorological data compilation
7. Air quality data compilation
8. Emission data compilation/speciation

9. Base-case simulations
10. Performance evaluations
11. Future case simulations
12. Control strategy designs (if needed)
13. Control strategy simulations (if needed)

In the above list, the primary concerns may be directed to Tasks 3 and 4, since they are most time and resource consuming.

Development of meteorological and air quality data bases Historical UAM applications typically have taken approaches that relied on special field studies to collect air quality and meteorological data to supplement routinely available data. Utah's historical meteorological and air quality data bases are spatially data sparse and a scoping analysis will need to be completed to determine the adequacy of the data set.

Development of UAM Emission Data Bases UAM emission data bases for modeling ozone are much more complicated than emission data bases for modeling non-reactive pollutants such as PM10. The UAM emission data bases have to provide sufficient information to derive emissions for each hour of a typical ozone episode day and for each of about 15 chemical species emitted from each emission source. The emission data bases have to be developed based on certain categories so that emission sources can be speciated using characteristic speciation profiles.

Modeling Schedule

Tentative schedule of tasks for all phases of
Salt Lake/Davis County ozone study

Task	Completion Date
Step 1: Base Year	
Scoping study	Completed
Work plan and protocol	Completed
Computer hardware and software	Completed
Aquisition of raw meteorological and air quality data bases	Completed
UAM modeling domain expansion	Completed
Meteorological data compilation	October 1996
Air quality data compilation	October 1996
Mobile emission data bases (UDOT transportation model; MOBILE5A)	Completed
Development of UAM emission (stationary) data bases	Completed
Emission data preprocessing (EPS2.0)	November 1996
Base-case simulations	December 1996
Performance evaluations	January 1997
Step 2: Attainment Year with different controls	
Development of 1994 UAM emissions database (point, area, mobile and biogenic)	January 1997
Emission data preprocessing (EPS2.0) (Emission Processing System)	February 1997
Maintenance plan simulations for 1994	March 1997
Maintenance plan simulations for 2007	April 1997
If control measures in maintenance plan do not achieve attainment, simulate additional control measures and repeat **Step 2**.	May 1997
Preparation of final report	June 1997